IMCSM Proceedings

ISSN 2620-0597

Volume XIX, Issue (1), (2023)

An international serial publication for theory and practice of Management Science

Editor-in-Chief: Prof. dr Živan Živković

Published by University of Belgrade, Technical Faculty in Bor, Department of Engineering Management

Bor, 2023

Scientific Board (SB) of the Conference:

Živan Živković, University of Belgrade, Technical Faculty in Bor, **president of the SB**.
Predrag Đorđević, University of Belgrade, Technical Faculty in Bor, **vice-president of the SB**.

Members of SB:

Aćimović, S., University of Belgrade, Faculty of Economics, Belgrade, Serbia;
Bazen, J., Saxion University of Applied Sciences in Enschede, The Netherlands;
Beh, L.S., University of Malaya, Faculty of Economics and Administration, Kuala Lumpur, Malaysia;
Chelishvili, A., Business and Technology University, Tbilisi, Georgia;
Duysters, G., Eindhoven University of Technology, Eindhoven, The Netherlands;
Filipović, J., University in Belgrade, Faculty of Organizational Science, Belgrade, Serbia;
Gao, S., Edinburgh Napier University, Edinburgh, United Kingdom;
Grošelj, P., University of Ljubljana, Biotechnical faculty, Ljubljana, Slovenia;
Gupte, J., Goa Institute of Management, Poriem, Sattari, Goa, India;
Halis, M., Bolu Abant Izzet Baysal University, Faculty of Communications, Bolu, Turkey;
Huth, M., Fulda University of Applied Sciences, Fulda, Germany;
Kangas, Y., University of Eastern Finland, Joensuu, Kuopio, Eastern Finland, Finland;
Kume, V., University of Tirana, Faculty of Economics, Albania;
Michelberger, P., Obuda University, Budapest, Hungary;
Mumford, M. D., University of Oklahoma, Norman, Oklahoma, USA;
Mura, L., University of Ss. Cyril and Methodius, Trnava, Slovakia;
Nikolić, Đ., University of Belgrade, Technical Faculty in Bor, Serbia**;**
Nordal, A., Municipal Undertaking for Educational Buildings and Property, Oslo, Norway;
Pang, J., Shanxi University, School of Computer and Information Technology, Taiyuan, Shanxi, China;
Parnell, J. A., University of North Carolina Pembroke, School of Business, Pembroke, USA;
Pavlov, D., "Angel Kanchev" University of Ruse, Bulgaria;
Piricz, N., Óbuda University, Keleti Károly Faculty of Business and Management;
Prasad, R., Banaras Hindu University, Institute of Management Studies, India;
Radosavljević, S., Kolubara coal basin, Lazarevac, Serbia;
Radulescu, M., University of Pitiesti, Faculty of Economics, Pitiesti, Romania;
Remeikiene, R., Mykolas Romeris University, Vilnius, Lithuania;
Spasojević Brkić, V., University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia;
Stanujkić, D., University of Belgrade, Technical Faculty in Bor, Serbia;
Stefanović, D., University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia;
Stević, Ž., University of East Sarajevo, Faculty of Transport and Traffic Engineering, Doboj, Bosnia and Herzegovina;
Szarucki, M., Cracow University of Economics, Cracow, Poland;

CIP - Каталогизација у публикацији

Народна библиотека Србије, Београд

005.51(082)(0.034.2)

INTERNATIONAL May Conference on Strategic Management (19 ; 2023 ; Bor)
XIX International May Conference on Strategic Management – IMCSM[23] Proceedings, [May 25, 2023, Bor, Serbia] [Elektronski izvor] / [editor-in-chief Živan Živković]. - Bor : University of Belgrade, Technical Faculty, Department of Engineering Management, 2023 (Niš : Grafika Galeb). - 1 USB fleš memorija ; 1 x 2 x 6 cm. - (Edition IMCSM Proceedings ; vol. 19, issue (1) (2023), ISSN 2620-0597)

Sistemski zahtevi: Nisu navedeni. - Nasl. sa naslovne strane dokumenta. - Tiraž 100. - Bibliografija uz svaki rad.

ISBN 978-86-6305-136-2

a) Стратешки менаџмент -- Зборници

COBISS.SR-ID 116570377

INTERNATIONAL MAY CONFERENCE ON STRATEGIC MANAGEMENT

Volume XIX, Issue (1) (2023) p1-p13

International May Conference on Strategic Management

FORMING CULTURE OF HIGH EFFICIENCY THROUGH COACHING IN EDUCATION OF MANAGERS

Elena Kalugina*

Coach ICA, Belgrade, Serbia

Abstract: Forming manager's skills to create a culture of high efficiency in the current conditions of high turbulence of economic and social processes helps to ensure the company's strategic competitive advantage.
Analysis of the requests on building a culture of high performance in a company received from managers during coaching sessions show the need for skills, which improve cooperation and create opportunities for maximization of the teams' potential. Aforementioned results can be achieved through a clear vision of goals and ways to reach them, through an increase in the level of responsibility and involvement, through the coordination of individual goals employees and business objectives of the company. One of the tools for the formation of these skills is the coaching approach to management.
The article discusses coaching leadership, which relies on such managerial competencies as partnership, trust, active listening, learning and development. The formation of these competencies is possible only at the level of values, which entail the need to generate new knowledge, with its subsequent transfer to the operational level. Awareness of the importance of these values is laid only in an educational culture that shares these values. At the same time, education of future managers based on a coaching approach is a powerful driver of professional and personal development, and best reflects the essence of lifelong learning competencies.
The article presents and analyzes the main global and Russian trends and prospects in the field of education that contribute to the formation of coaching leadership competencies among managers. The author conducted a study of the relationship between the introduction of coaching culture in the educational process and the increase in the level of competencies formed by students that are in demand on the labor market. Based on secondary and primary data, the need for special proactive teaching methods aimed at developing the coaching leadership competencies of managers in order to form a culture of high efficiency is shown.

Key words: coaching, leadership, culture of high efficiency, social capital, trend analysis, quantitative methods

1. INTRODUCTION

Today's brittle, anxious, non-linear and incomprehensible BANI world (Grabmeier, 2020) places new demands on the competencies of an effective manager. Today the strategic competitive advantage of a company depends more than ever on the manager's ability to create a culture of high performance.

* *Corresponding author: kaluginaev356@gmail.com*

High efficiency culture in management manifests itself through cooperation and creation of opportunities for maximum disclosure of personnel potential, through clear vision of goals and ways of their achievement, through increase of responsibility and involvement level, through cooperation and consonance of individual goals of employees and business tasks of the company.

Currently these transformations have a special impact on the change of social capital of the organization. According to P. Bourdieu (1994), social capital is "a set of real or potential resources associated with the possession of a stable network of more or less institutionalized relations of mutual acquaintance and recognition". The fundamental approach to the concept of social capital by P. Bourdieu (1981) was developed in the works of R. Putnam (2000), who understands social capital as the characteristics of organizational activity "including networks, norms and social trust, which promote coordination and cooperation in the interests of the public goal" (Zalevskaya & Zalevskaya, 2015).

Thus, the main characteristics of social capital as a resource of the organization, are the system of interconnection and cooperation between participants of production processes, communication networks and the establishment of relations of trust between team members. The identification of this type of capital and the description of its characteristics and conditions of use caused in the 80's of the 20th century the need for a tool for its formation and increase. Such tool appeared at the junction of cognitive-behavioral therapy, project management and the theory of emotional intelligence and was called coaching.

The ideologist of coaching is called Timothy Gallwey, an American business trainer, bestselling author (Gallwey, 2000), the creator of the method of increasing personal and professional efficiency by eliminating internal obstacles to achieve efficiency, awareness and pleasure.

The model that underlies the method The Inner game - a person's effectiveness is equal to his potential minus internal barriers, of which fear is the strongest. The essence of coaching was revealed in 1992 by the Englishman Sir John Whitmore (2017), a disciple and follower of Timothy Gallwey (2000), in his book " Coaching for Performance", where he described, among other things, the effect of coaching on people's performance and gave practical advice and exercises. The rapid spread of coaching as a method of personal development has confirmed the need for tools to increase social capital and has formed such a new area of consulting services as coaching. Coaching is a process built on the principles of partnership that stimulates the thinking and creativity of clients and inspires them to maximize their personal and professional potential. This is the definition from the International Coaching Federation (2021), the world's largest non-profit professional association of Personal and Business Coaches with more than 5,000 members and 179 offices in 30 countries.

Thus, the formation of social capital on the basis of the coaching approach relies, among other things, on such managerial competencies as partnership, trust, learning and development.

Formation of these competences is possible at the level of values, which entails the need to generate new knowledge, with its subsequent transfer to the operational level and thereby increasing social capital of both the employee and the organization as a whole. Formation of social capital occurs at realization of such functions of a society as training, interaction, development.

Awareness of the importance of these values is established in an educational culture that shares these values. At the same time, learning in such an educational culture is already a powerful driver of professional and personal development in itself, and best reflects the essence of lifelong learning competencies.

Learning competence is the ability to strive and persist in learning, to organize one's own learning, including effectively managing time and information both individually and in groups.

This competency includes awareness of one's own learning processes and needs, identification of available opportunities, and the ability to overcome obstacles to successful learning. Mastering learning skills engages learners to complement prior learning and life experiences in order to use and apply knowledge and skills across a variety of social capital formation contexts.

The purpose of this article is to evaluate the practice of implementing a coaching approach in education on the development of students' social capital. This is an urgent task for modern society to find mechanisms to ensure the formation of the need for lifelong learning for all members of society.

The author proposes a methodology for implementing the coaching approach, which focuses on the cooperation of the teacher and the learner, stimulates the student's thinking and creativity, inspires them to maximize their potential and ensures effective achievement of educational goals.

2. METHOD

The Center for the Use of Research and Evidence in Education in the United Kingdom (2014) has prepared standards for a National Framework for Mentoring and Coaching for Educational Use, reflecting its position that coaching "enables learners to take control of their own learning through inspiring questions, trust, and support".

The traditional teaching process consists of the following steps:

- The teacher assesses the learner's level of knowledge, sets a learning objective for the learner;
- gives tasks which should lead the student to master the material and comprehend the task set by the teacher;
- controls the execution of the task.

In this organization of the learning process, the teacher assumes the functions of the manager of the learning process, who has the responsibility from setting the goal, through the choice of means of achievement and up to the control of execution.

"Learning skills" as a key skill in the competence "lifelong learning" that contributes to the growth of social capital is proposed to go to the model proposed by Timothy Gallwey (2000), which includes:

- Awareness of own learning goals and needs;
- identification of available opportunities;
- the ability to take responsibility and overcome obstacles to successful learning.

At realization of model "Awareness, choice and trust" the natural ability of the person to learn and to achieve the goals set by himself or herself is shown.

In order to implement this approach, the author developed a methodology for higher education teachers to apply the coaching approach in the construction and implementation of the educational process. R. Putnam's statement (2000) that social capital index indicators correlate to a greater extent with the indicators of academic performance and the number of students who actively continue their studies was taken as a hypothesis of the research.

Assessment of the effectiveness of coaching methods in student learning can be achieved through several methods. Here are some of them:

1. Collecting feedback from students. One of the most effective ways to evaluate the effectiveness of coaching methods is to collect feedback from students. Anonymous surveys, interviews, or other methods can be used to gather student opinions on how they rate the effectiveness of coaching methods and what they can suggest for improvement.

2. Measuring improvement in student outcomes. One can measure improvement in student outcomes using a variety of methods, such as tests, exams, or other forms of assessment. If students show improvement in outcomes, it may be related to the use of coaching methods.

3. Comparing students' results to those of other groups. It is possible to compare the results of students who have been trained using coaching methods with the results of other groups of students who have not been trained using these methods. If students trained using coaching methods perform better, this may indicate the effectiveness of these methods.

4. Analyzing students' attendance and participation data. Students' attendance and participation data can be analyzed to assess how effective the coaching methods are. If students are more confident and active in participating in class, this may indicate the effectiveness of coaching methods.

In general, the effectiveness of coaching methods can be assessed through collecting feedback from students, measuring improvement in student outcomes, comparing student outcomes to those of other groups, and analyzing data on student attendance and participation in ongoing activities.

The effectiveness of the proposed methodology for implementing coaching methods in the educational process was assessed by two indicators: class attendance and active participation in the learning process.

If a teacher uses a coaching approach in teaching and communicating with students in the classroom, does it affect students in any measurable way? Does it change engagement, improve outcomes, and how can this be measured?

A teacher's performance is primarily assessed by the level of student learning. However, increasing student engagement helps create a supportive learning environment and achieve better mastery of the subject matter. How do you measure student engagement? How do you know if your students are engaged? What objective criteria can measure their engagement?

One possible tool for measuring student opinion is a questionnaire. But usually the survey takes place no more than twice a year and serves more to monitor the work of the teacher and to assess the organization of the learning process, which does not correspond to the objectives of the study. As the basis of collecting quantitative data to assess the effectiveness of the proposed methodology the author has chosen the method of observation of the work of study groups for changes in attendance rates and activity. Attendance was marked as the fact of presence at the study group classes (during the pandemic online presence), activity - as participation more than 2 times in two academic hours in raising questions or giving comments, performing a task on the subject of the class. Undergraduate and graduate students participated in the study. Data was collected over a six-year period from 2017 to 2022. The period from 2017 to 2019 academic years were taken as control because no coaching methods were used during this period, but the personal composition of the teachers was constant throughout the entire period of observation. Thus, we exclude the influence of the teacher's personality and qualifications on the learning process. Measurement of attendance and activity was carried out regularly, in the form of current control of academic performance and attendance, which are standard for a higher educational institution. For students at the undergraduate level the measurement was conducted during the course Business English (4 study groups), for students at the graduate level during training sessions on the course "Research Methods in Management" (3 study groups) in RANEPA.

Since 2019, the author began to actively implement the methodology of the educational process based on the coaching approach. The main provisions of the methodology include the following elements based on the basic model of coaching interaction.

2.1. Trust and partnership

Most teachers agree that the nature of the relationship between the teacher and the learner is the key to success. Establishing a trusting relationship lies in the ability to create an environment of safety (non-judgmental) and support that provides mutual trust, respect, and understanding, while remaining in a professional relationship zone where the teacher has a level of authority.

How does the teacher's ability to build a trusting relationship with the student manifest itself? It happens when the teacher:

- demonstrates a genuine interest in the success of the student;
- constantly demonstrates his or her own integrity, honesty, and sincerity;
- makes clear "agreements" and keeps promises;
- demonstrates respect for the student's perceptions, learning style, and personality;
- provides ongoing support for the student's transition to a new level of using what he or she has learned or practicing skills, especially when the student must accept an internal challenge or fears failure;
- respectfully provides developmental feedback.

Building a professional trusting relationship requires understanding and acknowledging the values of the other and establishing certain boundaries of the relationship.

Building trust is impossible without finding common ground, understanding and acceptance on the level of values and beliefs, and keeping promises.

If the reason is a misalignment of values, it requires, above all, work on oneself - one must accept the conviction that there are no right and wrong values, there is respect for the values of others.

2.2. Active listening

Teachers often note that the ability to hear not only what the student is saying, but also what he is not saying (his feelings, perhaps fears, unspoken desires, ambitions) and the ability to ask "powerful" or effective questions that inspire action helps especially when working in sensitive situations. Some students feel they are already experienced enough and see no need for change or further development.

In these situations, the active listening skill helps create a space of communication where students are willing to trust the teacher with their deep feelings.

How does the active listening skill manifest in the teacher? While communicating with a student the teacher:

- focuses on the student, what he is saying, his feelings, thoughts, beliefs, values;
- summarizes, paraphrases, and repeats what the student has said to make sure he/she understands the student's thoughts and goals;
- allows the student to speak and "clarify" the situation without making judgments or taking sides.

It is the skill of active listening that creates a space of trust and partnership where freedom of expression is encouraged.

2.3. Powerful Questions

Powerful or effective questions promote self-understanding and awareness of one's potential. Effective questions are generally short, simple, clear and concise. They are inextricably linked to the skill of active listening and depend primarily on what the interlocutor

has said. Effective questions are followed by a pause that allows the interlocutor to hear the question and reflect on it. They always stimulate thinking and looking for new possibilities. Effective questions help you move to a deeper level of responsibility. When the student has his own solution to a problem, he does not need to be "pushed" into action. When the student recognizes the value of his actions to achieve his goal, he is motivated to take responsibility for bringing the action to completion.

How does the teacher's ability to ask effective questions manifest itself? When the teacher:

- asks questions that reflect active listening and understanding of the interlocutor's views;
- asks questions that awake discoveries and provoke purpose and activity;
- asks open-ended questions that generate greater clarity, new possibilities, or knowledge;
- asks questions that move the student toward a goal rather than requiring excuses.

2.4. Direct Communication

Direct communication is the ability to articulate oneself clearly, concisely, and directly with respect for the interlocutor.

The developmental feedback tool strictly builds on the skill of direct communication. Feedback is possible when the interlocutor has the intention and desire to receive it, and it is advisable to obtain permission before giving it. The subject of getting permission is very important in establishing trust and partnership. If you show respect and ask permission and then use the skill of non-judgmental direct communication, this feedback will help the student see themselves from the outside, understand how they are moving toward their goal and take responsibility for their outcome.

The feedback in this case should:

- contain positive intent;
- be descriptive rather than evaluative;
- be specific;
- be based on facts or behavior rather than interpretation;
- be constructive and helpful.

3. RESULTS

The quantitative results characterizing the effectiveness of the developed by the author methods of implementation of the coaching approach in the educational process of the university contain data on the average values of class attendance and activity in classes of undergraduate and graduate students by level of training and generalized data for all groups for the period from 2017 to 2022. Since 2019, the coaching approach was introduced in the educational process, so to test the hypothesis about the impact of the coaching approach on the formation of social capital of students, the data obtained for the period from 2017 to 2019 were compared with the data obtained for the period 2019 - 2022. Figure 1. The results of measuring the level of attendance (the average value of the list of training groups 1- 4) for the study period are presented. Beginning in 2019, the year of implementation of the coaching approach, there has been an increase in attendance rates. The personal composition of the groups varied from year to year, but the general trend of attendance growth was maintained.

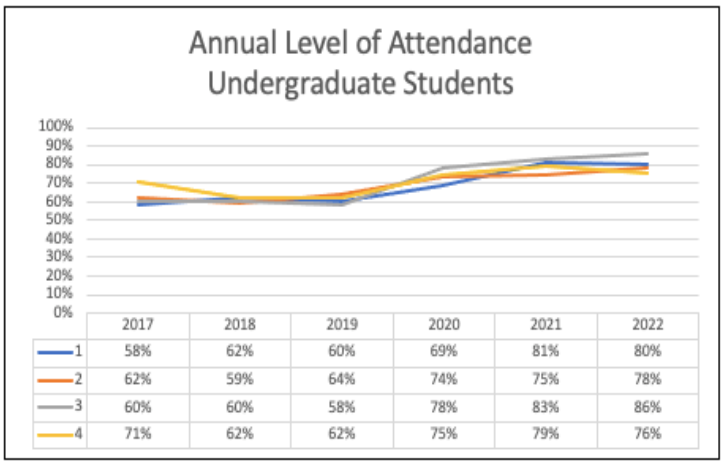


Figure 1. Average class attendance for the four undergraduate study groups from 2017-2022 (Author's calculations)

The data show that with the application of the coaching approach in teaching English to 2nd year students, attendance has increased from 14% to 20%. And that's assuming a constant shift between online and offline formats due to the pandemic period.

How significant is this increase? If we take the number of hours in the annual curriculum, 20% would give us an additional 32 academic hours, which is more than a month of regular classes. The picture is somewhat different for graduate students (Fig. 2).

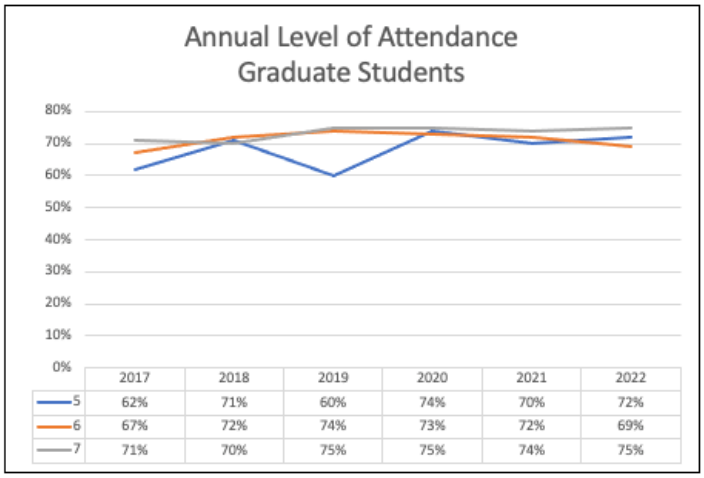
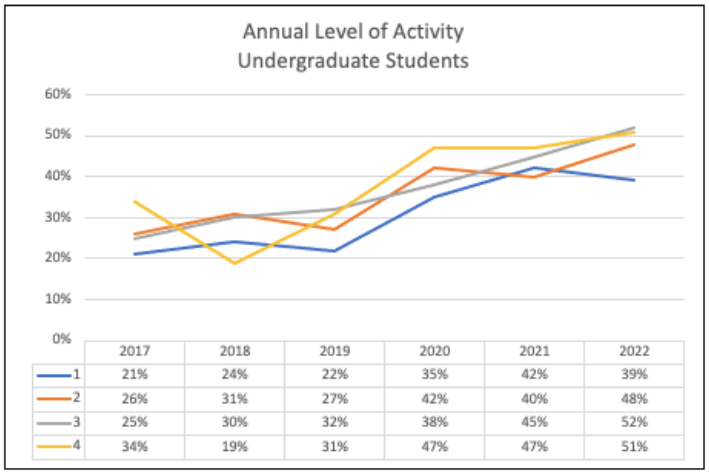


Figure 2. The average class attendance for the three master's study groups for the period 2017-2022 (Author's calculations)

The graduate students show less pronounced growth in attendance. This is due to the traditional, for this form of education, the combination of study and work. The possibility of growth of attendance percentage is limited by external objective factors and does not exceed 12% for the period, but the fact of growth of this indicator indicates greater motivation to study against the background of the introduction of the coaching approach.

The second indicator that was measured during the study was the activity rate in the class. Inclusion in the learning process, involvement in the classroom work is the indicator, but which should have been influenced by the method of building classes with the use of the coaching approach proposed by the author. Comparison of the results of the experimental period from

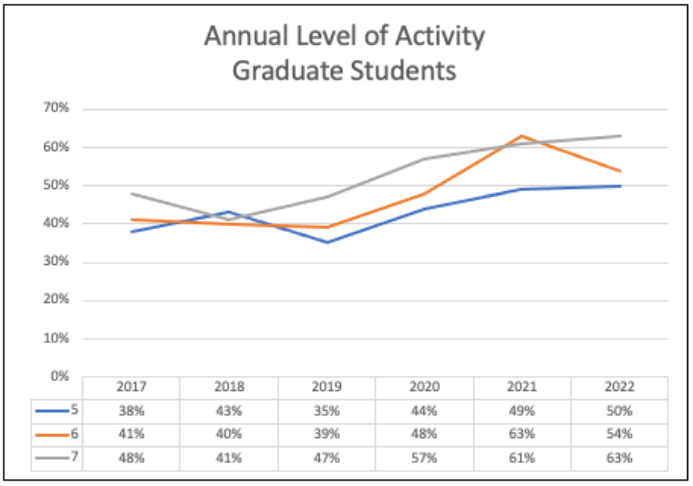
2020 to 2022 with the control 2017-2019 allows us to judge the presence of a positive impact of the coaching approach on students' activity. Fig. 3 shows the results of measuring the average level of undergraduate students' activity by periods.



	2017	2018	2019	2020	2021	2022
1	21%	24%	22%	35%	42%	39%
2	26%	31%	27%	42%	40%	48%
3	25%	30%	32%	38%	45%	52%
4	34%	19%	31%	47%	47%	51%

Fig. 3 Average activity in classes for four undergraduate study groups for the period 2017-2022 (Author's calculations)

The analysis of the results allow us to state the steady, positive dynamics of the activity index after the implementation of the coaching approach in the educational process. The growth was 20% or more, which led to the fact that the number of students involved in learning the material increased from 20% to 50%. The same picture is observed for graduate students (Fig. 4).



	2017	2018	2019	2020	2021	2022
5	38%	43%	35%	44%	49%	50%
6	41%	40%	39%	48%	63%	54%
7	48%	41%	47%	57%	61%	63%

Fig. 4 The average activity in the classes for the three groups of master classes for the period 2017-2022 (Author's calculations)

It is noteworthy that regardless of the level of activity of the control period (2017-2019) the growth of activity immediately after the implementation of the coaching approach increased by at least 10% and remained at this level thereafter. This indicates that the implementation of the author's methodology has a sustained positive effect on both measured indicators. To confirm this conclusion, trend dependences were built for both indicators on the basis of averaged indicators for bachelors and masters (Fig. 5,6).

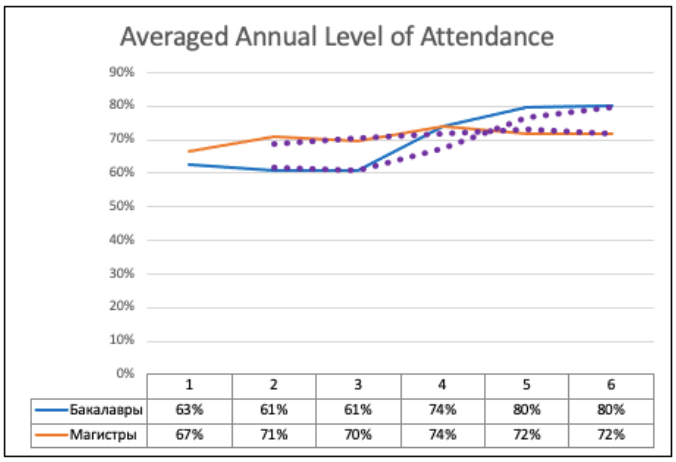


Figure 5. Trends of changes in average attendance rates by year for undergraduate and graduate students (Author's calculations)

The analysis of the graph in Fig.5 allows us to talk about the difference in the attendance rates of undergraduate and graduate students. The introduction of the coaching approach has less impact on undergraduates who combine work and study than on bachelors, who have seen a steady increase in attendance since 2020.

In turn, the average activity rate for master's students (Figure 6) is generally higher and more influenced by the coaching approach than for bachelor's students. At the same time, the general trend of activity growth after the implementation of the coaching approach is observed for students of both forms of study.

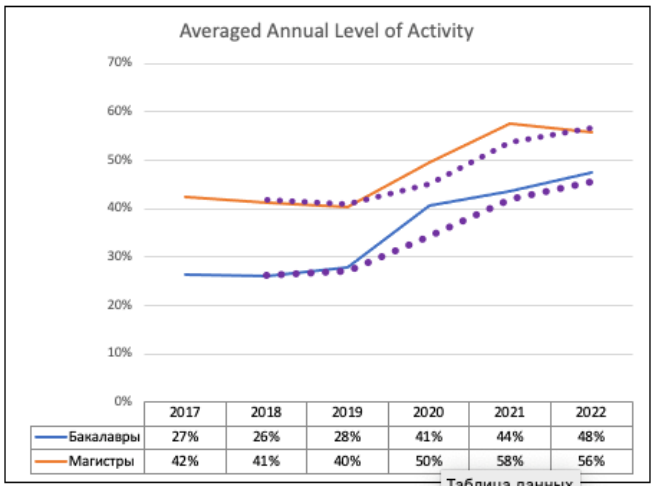


Figure 6. Trends of changes in the average activity indicators by year for undergraduate and graduate students by year (Author's calculations)

Let's comment, based on the observation of students' behavior in class, how the index of activity growth is expressed.

The classes become more lively, there is no need to persistently call students and ask them to comment or express themselves on any topic. The fear of making a mistake disappears and there is a desire to express one's own thought. Students in the class:

- willingly share their opinions;
- are active in group work;

- eagerly participate in discussions;
- discuss global concepts;
- complete a higher percentage of assignments.

The application of the coaching approach in teaching also influenced the level of learning. The following indicators can be highlighted:

- deeper understanding of the topics, concepts, and concepts discussed in class;
- formation of connections with already acquired knowledge, students understand the system of formation of their skills and can independently suggest an effective method of self-learning and self-development.

Classes form the skill that underlies the concept of lifelong learning and ensures the growth of social capital:

- translation and retention of information in long-term memory;
- demonstration of systematic and critical thinking;
- increased academic achievement.

The use of the coaching approach in teaching creates a developing educational culture in the classroom, changes the student's attitude to the process of acquiring knowledge, and forms a more conscious approach to mastering knowledge. The student independently manages the acquired knowledge and himself, builds his own developmental trajectories, which is necessary for the transition to the "lifelong learning" model.

4. DISCUSSION

The application of the coaching approach to student learning is an actively researched topic in academic circles.

In the article "Coaching in university education: A review of the literature," Milenkova et.al. (2016) review the literature on the use of coaching in university education and consider various aspects of coaching, such as using coaching to improve students' academic performance, develop their personal and professional skills, and increase their motivation and confidence in their abilities. The authors also discuss different approaches to coaching, such as individual coaching, group coaching, and career coaching. The article also presents research findings that show that the use of coaching in university education can lead to improved academic performance and increased student motivation.

The authors present research findings that show that the use of coaching in university education can lead to improved academic outcomes and increased student motivation. Some of these results include:

- Improved student performance, especially in those with low grades;
- increased student motivation and confidence in their abilities;
- improvement in students' personality traits, such as confidence;
- self-efficacy, self-control, and the ability to self-regulate;
- development of students' professional skills, such as communication;
- leadership, time management, and project management;
- increasing student satisfaction with the learning process and increasing their loyalty to the university.

Overall, the article summarizes the many studies that show the positive results of applying coaching in university education and emphasizes its potential to improve learning outcomes and student development.

In the article "The effect of coaching on academic performance of nursing students: A randomized clinical trial," Keshavarz et.al. (2015) examine the effects of coaching on the

academic performance of medical school students. Specifically, they address the following questions:

- How does coaching affect the academic performance of nursing students?
- What specific methods of coaching are most effective in improving students' academic performance?
- What factors can influence the effectiveness of coaching in the learning process?

To answer these questions, the authors conducted a randomized clinical trial in which medical school students were divided into two groups, an experimental group (which received coaching) and a control group (which did not receive coaching). The authors evaluated the performance of students in both groups and analyzed the results to determine how coaching affected students' academic performance.

The article investigated several methods of coaching to determine which ones were most effective in improving students' academic performance. The study divided students into two groups: a control group and a group that received coaching.

The group that was given coaching used the following methods:

1. Setting goals and developing action plans to achieve them.
2. Stimulating student motivation through positive feedback and recognition of achievement.
3. Helping students develop self-reflection and self-examination skills.
4. Using visualization techniques to assist in understanding the material.
5. Supporting students in developing confidence in their abilities.

The results of the study showed that students who received coaching showed significantly higher academic performance than students in the control group. Specifically, after undergoing the coaching program, students showed a 7.5% improvement in academic performance as well as increased levels of motivation and confidence in their abilities.

Stoker et.al. (2016) reviewed and analyzed a number of studies that examine the use of coaching in higher education and its impact on students' learning outcomes, motivation, and confidence in their abilities.

The article "Coaching in Schools" is a practical guide for coaches and their supervisors who work in educational institutions. Katsikis et.al. (2018) discuss the following main points:

1. The purpose of coaching in education is to help teachers and administrators improve their professional practices to improve student outcomes.
2. Coaching in education is not an assessment tool, but rather a means to develop professionalism and self-awareness.
3. Coaching should work closely with teachers and administrators to help them identify their goals and develop an action plan to achieve them.
4. As in other fields, coaching in education requires a high degree of skill and professionalism on the part of the coach.
5. Coaching leaders must provide support and resources for coaches to help them achieve maximum effectiveness.
6. Coaching must be integrated into the institution's overall development strategy to provide maximum benefit to teachers, administrators, and students.

Overall, this article is a practical guide to coaching in education that may be useful to coaches, coaching leaders, and others interested in the educational field.

The study "Coaching for academic success: A study of peer coaching as a method of improving student success" (Shea & Bidjerano, 2013) conducted on university students also showed the positive effect of using coaching in education. In particular, students who received coaching showed a 10-15% improvement in academic performance compared to students who did not receive coaching.

Overall, these and many other studies confirm that coaching can be an effective tool for improving student learning outcomes. However, it is important to note that the effectiveness of coaching can depend on many factors, such as the qualifications of the coach, the quality of the interaction between the coach and the student, and the context in which the coaching takes place.

5. CONCLUSIONS

Coaching methods can be useful in teaching because they help students develop their independent problem-solving and self-reflection skills. Here are a few ways to apply coaching methods to teaching:

1. Ask questions. Instead of giving students answers, ask them questions that will help them come up with the right solution on their own. This will help them develop analytical and critical thinking skills.

2. Help students identify their goals. Help students set goals and develop action plans to achieve them. This will help them be more motivated and organized in their learning goals.

3. Listen to students. It is important to understand that each student is unique, so approach each student individually. Listen to their needs and desires to help them achieve their academic goals.

4. Help students develop self-reflection skills. Help students evaluate their successes and failures and develop plans to improve their skills. This will help them become more independent and confident in their abilities.

5. Use positive reinforcement. Appreciate students' successes and encourage them on achievements. This will help them stay motivated and continue to develop.

6. Use effective feedback. Provide students with constructive feedback to help them understand what they are doing right and what they need to improve. This will help them develop and improve in their learning skills.

Coaching techniques can help students develop independence and confidence in their abilities, which can lead to more successful academic performance.

Overall, the studies cited in this article and many others confirm that coaching can be an effective tool for improving students' academic performance. However, it is important to note that the effectiveness of coaching can depend on many factors, such as the qualifications of the coach, the quality of the interaction between the coach and the student, and the context in which the coaching takes place.

The following coaching techniques to influence student attendance and activity rates were discussed in this article:

- Skills for creating a professional relationship between faculty and students based on trust, partnership, and a transparent "agreement" that governs that relationship

- skills of building effective communication, which allow you to hear not only what your student says, but also what he or she thinks, which help through strong questions to open to the student his or her inner motives, values and beliefs, and through direct communication to allow the student to realize how much these beliefs move him or her toward the goal, or limit the realization of the potential inherent in him or her.

The implementation of the proposed methodology, the value of which is proved by quantitative data on the growth of attendance rates and activity, will provide an increase in the effectiveness of the educational process and the growth of social capital in modern society as a whole.

REFERENCES

Grabmeier, S. (2020). BANI versus VUCA: A New Acronym to Describe the World. Germany: Stephangrabmeier, 112-132.

Bourdieu, P. (1981) Political representation (Elements for a theory of the political field). Proceedings of research in the social sciences, 36-37.

Bourdieu, P. (1994) Practical reasons. On the theory of action: Editions du Seuil, 251.

Putnam R. D. (2000) Bowling Alone: The Collapse and Revival of American Community. United States of America: Simon & Schuster.

Zalevskaya E.V., Zalevskaya O.S. (2015) R. Putnam's Concept of Social Capital as Applied to the Emerging Standards for Evaluating the Effectiveness of Volunteer Projects. Historical, Philosophical, Political and Legal Sciences, Cultural Studies and Art History. Issues of Theory and Practice. Russia: Gramota

Gallwey, T. (2000) The inner game of work. United States of America: Random House

Whitmore, J. (2017) Coaching for Performance, United States of America: Nicholas Brealey Publishing

International Coaching Federation (2021) Elevate: 2021 Annual report. United States of America: ICF

Centre for the Use of Research and Evidence in Education (2014) National Framework for mentoring and Coaching for Educational Use, UK: CUREE Limited

Keshavarz S. M., Jafari S. M., Asgari F. (2015) The effect of coaching on academic performance of nursing students: A randomized clinical trial, The Netherlands: Nurse education today, 35, 135-139

Stoker J. R., Franzak J. M., Ponder J. W. (2016) Coaching in higher education: A review of the literature. Journal of Applied Research in Higher Education, Emerald Group Publishing 8 (2), 194-211

Milenkova, M.I., Todorov V. V., Petrova L. A. (2016) Coaching in university education: A review of the literature. Bulgaria: Bulgarian Journal of Science and Education Policy, 10, 52-70

Katsikis, D., Kassapis, S., Kostogiannis, C., Bernard, M.E. (2018). Coaching in Schools: Coaching for Rational Living. Germany: Springer, 397-412

Shea T. H., Bidjerano J. (2013) Coaching for academic success: A study of peer coaching as a method of improving student success, Journal of Applied Research in Higher Education, Emerald Group Publishing, 5 (3), 95-101

Volume XIX, Issue (1) (2023) p14-p30

International May Conference on Strategic Management

SECTOR VALUE ADDITION AND ENVIRONMENTAL QUALITY IN THE REPUBLIC OF SERBIA

Petar Mitić*

Institute of Economic Sciences, Belgrade, Serbia

Abstract: The unprecedented pace of climate change and global warming, primarily caused by human activities, has become a pressing concern worldwide. This research explores the effects of sectoral value added, electricity generated from renewable sources, and human development index on CO_2 emissions in Serbia using time series data from 1995 to 2021 and the ARDL approach. The findings suggest that agriculture value added has a significant and negative impact on CO_2 emissions in the long term, while industry and services value-added do not have a statistically significant relationship with CO_2 emissions. The research also indicates that enhancing human development and increasing the proportion of renewable energy sources, in the long run, have a considerable and negative association with CO_2 emissions. Policies that improve human development and promote renewable energy sources in electricity production have positive long-term environmental consequences. However, further studies are necessary to distinguish between the individual contributions of agriculture, industry, and services value added in the Serbian context.

Keywords: sector value addition, CO_2 emissions, ARDL, Serbia

1. INTRODUCTION

The pace of climate change and global warming is faster than at any time in history, largely due to human activities. As a result, climate change has led to various global phenomena, including rising sea levels, acidification of seawater, loss of ice sheets, the spread of forest fires, worsening of heat waves and tropical cyclones, and increasing food shortages (WMO, 2020). In addition, climate change threatens society and ecosystems as severe weather events become more frequent. The number of extreme events causing damage each year is influenced by human factors, such as growing population and infrastructure, and natural climate variability, i.e., warm temperature extremes and heavy rainfall events have changed in frequency (Kirikkaleli et al., 2023).

The World Meteorological Organization has reported that the second decade of the XXI century was the warmest on record. The National Oceanic and Atmospheric Administration confirms this, noting that seven of the warmest years on record have occurred since 2014 (NOAA, 2021). The global average temperature for 2022 is projected to be 1.15 °C higher than the pre-industrial average between 1850 and 1900 (WMO, 2022). The IPCC Special Report, "Global Warming of 1.5°C," has warned that limiting global warming to 1.5°C by the end of the century is necessary to avoid lasting and catastrophic consequences. Achieving this goal will require an urgent transformation of the economy, environment, and society, starting with

* *Corresponding author: petar87ns@gmail.com*

achieving net-zero CO_2 emissions by 2050 (IPCC, 2018). The World Meteorological Organization has further expressed concern about Arctic temperatures. On December 14, 2021, the temperature reached a new record high of alarming 38 °C. The organization has emphasized the urgent need for humanity to curb emissions and adopt an environmentally sustainable lifestyle to help Mother Nature recover and sustainably replenish resources for future generations (Hall et al., 2021).

In today's professional and scientific debates, the links between economic growth, environmental degradation, and energy use have become important issues. While most countries strive for economic growth and development, they also want to reduce environmental degradation. To achieve this, it is critical to study the interactions between the economy and the environment qualitatively and quantitatively. Such studies can provide decision-makers with a better understanding of these phenomena and enable them to make more informed decisions (Wang et al., 2016; Boamah et al., 2020; Petrović-Ranđelović et al., 2020).

In 1999, Serbia's economic growth was severely affected by political unrest and the NATO bombing, resulting in a 9.42% decline (The World Bank, 2021). Since 2000, however, Serbia has transformed its economy and made significant progress in restructuring and privatizing enterprises, liberalizing trade, and achieving positive economic growth. The global financial and economic crisis of 2009 adversely affected the Serbian economy, leading to a 2.73% contraction (The World Bank, 2021) that revealed structural weaknesses in the economic growth model and underscored the need for fiscal consolidation and transitional closure. The EU granted candidate status to Serbia in 2012, and a Stabilization and Association Agreement between the EU and Serbia was signed a year later. Serbia began accession negotiations in January 2014 after the 1st Intergovernmental Conference (European Commission, 2022).

Serbia's economic growth is the result of a multi-faceted approach. The government has taken several measures to improve the business climate, including tax incentives and simplified administrative procedures for investors. Education, innovation, and regional integration are also important government priorities. Serbia has expanded its higher education system, established innovation centers and technology parks, and actively developed its agricultural sector. The country has also invested in renewable energy sources to reduce its dependence on fossil fuels. Since 2016, the government has been implementing reforms in the social sphere, public administration, public finances, and the entire economic system while striving for EU membership. Serbia enjoyed significant economic growth from 2015 to 2019, but the global COVID-19 pandemic and the Russian-Ukrainian crisis have undoubtedly disrupted this trend.

In terms of environmental sustainability, Serbia's main source of electricity comes from fossil fuels. Coal, particularly lignite, was responsible for 69% of the country's electricity in 2018, while the remaining 31% was generated by hydropower. Alternative forms of electricity generation, such as solar, wind, and biomass, account for only a miniature share of Serbia's energy mix (EIA, 2021). With approximately 4.5 billion tons of confirmed lignite reserves, Serbia has significant coal reserves, with Kolubara and Kostolac being the two most important coal basins (Bankwatch Network, 2021). Both are owned by the Electric Power Industry of Serbia (EPS), a state-owned company that owns most of the country's production capacity and supplies most consumers. While urban areas in Serbia have high PM_{10} and NO_2 concentrations, carbon dioxide (CO_2) remains the most important greenhouse gas, accounting for 78.9 to 83.8% of total greenhouse gas emissions between 2000 and 2014 (UNFCCC, 2017). For the above reasons, CO_2 emissions are used as a proxy for environmental degradation, while the share of electricity from renewable sources is a control variable.

In addition, the value added by different sectors of the economy, such as agriculture, industry, and services, is important for assessing environmental quality in a country because each sector has unique environmental impacts. Understanding these impacts can help

policymakers develop targeted policies to mitigate adverse environmental impacts and promote sustainable economic growth. Additionally, human development is important in assessing a country's environmental quality because it reflects its ability to balance economic and social progress with environmental protection and sustainability. Therefore, the human development index (HDI) is introduced in this study as a proxy for the quality of life and overall well-being of people living in a particular country.

Previous studies have examined the relationship between sectoral value added, the share of renewable electricity, and human development on environmental factors. For example, Samargandi (2017) examined the relationship between sectoral value-added, technology, and CO_2 emissions in Saudi Arabia and found that value added in industry and services was responsible for an increase in CO_2 emissions, while value added in agriculture did not show a significant relationship. Other studies, such as Al Mamun et al. (2014), have examined the impact of economies transitioning to service-based industries and found that pollution was greater in high-income countries and lower in low- and middle-income countries. Similarly, human development studies, such as Beith's (2021) study of 6 ASEAN countries and Japan, have shown that the HDI has a positive but insignificant effect on CO_2 emissions. In addition, numerous studies have found that the share of electricity from renewable sources has a significant negative effect on CO_2 emissions, including the study by Sarkodie and Ozturk (2020) on Kenya, the study by Al-Mulali et al. (2020) on Ethiopia, and Bölük and Mert (2015) on Turkey.

Given all the above, the main research objective of this study is to investigate the impact of sectoral value added, electricity from renewable sources, and HDI on CO_2 emissions in Serbia using the ARDL approach for time series data from 1995 to 2021.

The main contribution to the literature is that no previous study has examined the interplay between sectoral value-added and environmental degradation in Serbia to the best of my knowledge. I hope this study will contribute to the national and regional discourse on climate change and its impacts on Serbia.

After the introductory remarks, the second section is devoted to the methodology and data used in the study. The third section discusses the empirical results, while the final section provides conclusions, policy recommendations, and suggestions for further research.

2. DATA AND METHODOLOGY

2.1. Data

Table 1. Variable description

Variables	Abbreviation	Scale Unit	Source
Territorial CO_2 emissions	CO_2	million tonnes	Global Carbon Atlas (2023)[1]
Agriculture, forestry, and fishing, value-added	AVA	% of GDP	The World Bank (2023)
Industry (including construction), value-added	IVA	% of GDP	The World Bank (2023)
Services, value-added	SVA	% of GDP	The World Bank (2023)
Human Development Index	HDI	score between 0 to 1	Roser, M. (2014)
Electricity from renewable sources	REL	%	Ritchie, H. (2022)

[1] Citing the original data sources is required: Friedlingstein et al. (2022), Andrew and Peters (2022) and Peters et al. (2011).

The data on CO_2 emissions are from Global Carbon Atlas (2023), while agriculture, industry, and services value-added data are from The World Bank (2023). The human development index values used in this paper are from Roser (2014), and the share of electricity from renewables data is from Ritchie (2022). Table 1 provides a detailed overview of the variables and units used in this scientific paper.

Table 2 summarizes the descriptive statistics for the key variables in this study, including CO_2 emissions, sector value addition, HDI, and the share of electricity from renewables (REL).

Table 2. Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max	Obs
$lnCO_2$	3.842	0.155	3.430	4.108	27
AVA	9.548	4.486	5.954	18.418	27
IVA	28.549	3.253	24.902	35.293	27
SVA	47.705	3.873	40.279	51.856	27
HDI	0.749	0.048	0.674	0.811	27
REL	29.126	3.178	22.804	36.134	27

The mean value for CO_2 emissions (logarithmic) is 3.842 with a standard deviation of 0.155, indicating that emission values vary moderately among observations. The descriptive statistics for sector value addition show that the mean values for agriculture (AVA), industry (IVA), and services (SVA) are 9.548, 28.549, and 47.705, respectively, with moderate variation within the sample. The mean value for HDI is 0.749, with a standard deviation of 0.048, indicating that the sample has a relatively high level of human development. Finally, the mean value for electricity generated from renewable sources is 29.126%, with a standard deviation of 3.178%. Overall, the descriptive statistics suggest that the data are consistent and follow a relatively uniform pattern, although there is some variability between observations for some variables.

2.2. Methodology

The basis for the methodology of this study is a broad econometric model defined as follows:

$$E_q = f(E_g, \boldsymbol{F}) = \alpha + \beta E_g + \boldsymbol{\delta}'\boldsymbol{F}, \quad (1)$$

where the environmental quality indicator E_q is modeled as a function of the sector value addition indicator E_g, as well as a range of factors denoted as F, which may impact the quality of the environment.

The study assumes that agriculture, industry, and services value-added are the primary factors affecting the quality of the environment, reflected in CO_2 emissions. As described in the introduction, the human development index and the percentage of electricity generated from renewable sources were included as explanatory variables in the emissions-sectoral addition equation. Additional variables are introduced for policy design, prediction, and mitigation of bias from omitted variables, as Al-Mulali et al. (2020) suggested.

Based on the information provided, the econometric models A, I, and S were derived from equation (1) with a specific functional form:

$$\textit{Model A:} \quad lnCO_{2,t} = f(AVA_t, HDI_t, REL_t) = \alpha + \beta AVA_t + \delta_1 HDI_t + \delta_2 REL_t + \varepsilon_t \quad (2)$$

$$\textit{Model I:} \quad lnCO_{2,t} = f(IVA_t, HDI_t, REL_t) = \alpha + \beta IVA_t + \delta_1 HDI_t + \delta_2 REL_t + \varepsilon_t \quad (3)$$

$$\textit{Model S:} \quad lnCO_{2,t} = f(SVA_t, HDI_t, REL_t) = \alpha + \beta SVA_t + \delta_1 HDI_t + \delta_2 REL_t + \varepsilon_t \quad (4)$$

where the environmental quality indicator is a natural logarithm of CO_2 emissions $E_q = lnCO_{2,t}$) and it is represented as a function of AVA, IVA, and SVA for models A, I, and S, respectively. Furthermore, $\beta, \delta_1, \delta_2$ are loadings, α is a shift parameter, t is a time index, and ε_t is a white noise error.

2.2.1. Unit root analysis

The first step in the modeling process is to check for stationarity and determine the integration order of the variables. Non-stationary variables can lead to spurious regressions, biased estimates, and inflated coefficients of determination. It is essential to perform unit root tests to minimize the risk of spurious results. Since each unit root test has its limitations, the literature (Hossain, 2011; Yaseen et al., 2018) recommends using multiple tests. To ensure robustness, two conventional unit root tests were used: the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1976) and the Phillips-Perron (PP) test (Phillips & Perron, 1988).

The ADF statistical test builds on the Dickey-Fuller test and includes higher-order autoregressive processes in the model. The ADF test checks whether a time series is stationary or non-stationary by estimating a regression equation:

$$\Delta y_t = \alpha + \beta_t + \gamma y_{t-1} + \sum_{i=1}^{p-1} \delta_i \Delta y_{t-1} + \varepsilon_t, \quad (5)$$

where y_t is the time series of interest, α is a drift, β is a time trend coefficient, p is the lag order of the autoregressive process, γ is the coefficient presenting process root, and ε_t is the disturbance term. We test $H_0: \gamma = 0$ (there is a unit root) versus $H_1: \gamma < 0$. The ADF test is based on t statistics of the coefficient γ from the OLS estimation. When determining the order of integration of variables, it is important to note the differences between the PP and the ADF tests. While the ADF test uses parametric autoregression to estimate the ARMA structure of the errors in the test regression, the PP test ignores possible serial correlation. Therefore, the two major differences between the tests are the treatment of serial correlation of errors and heteroskedasticity. Both tests are applied at the level and first difference of all variables to obtain robust results.

2.2.2. ARDL bounds cointegration test

After conducting the unit root analysis, the long-run relationship between the variables was examined using a cointegration procedure. Cointegration is an econometric concept that indicates a long-run relationship between variables. In this study, the ARDL bound test proposed by Pesaran et al. (2001) was employed due to its advantages over traditional cointegration approaches (see Shahbaz et al., 2016; Zambrano-Monserrate et al., 2018; Pesaran & Shin, 1999; Odhiambo, 2009; Narayan & Smyth, 2005).

To save space, an ARDL model equation, where SECT refers to the variables AVA, IVA, and SVA for the corresponding models, will be presented. The ARDL model (l_1,l_2,l_3,l_4) is expressed as follows:

$$\Delta lnCO_{2,t} = \lambda_0 + \phi_1 lnCO_{2,t-1} + \phi_2 lnSECT_{t-1} + \phi_3 HDI_{t-1} + \phi_4 REL_{t-1} + \sum_{i=0}^{l_1} \lambda_{1,i} \Delta lnCO_{2,t-1} + \sum_{i=0}^{l_2} \lambda_{2,i} \Delta SECT_{t-1} + \sum_{i=0}^{l_3} \lambda_{3,i} \Delta HDI_{t-1} + \sum_{i=0}^{l_4} \lambda_{4,i} \Delta REL_{t-1} + \varepsilon_t, \quad (6)$$

where λ_0 is a constant coefficient, Δ represents the first difference of the variables, ε_t is the error term, $\phi_k, k = 1,2,3,4$ are the long-run coefficients, while $\lambda_{i,k}, i = 1,2,3,4,, k = 0, \dots, l_i$ are the short-run coefficients, and $l_i, i = 1,2,3,4$, represent the lag lengths. The optimal lag lengths are determined according to the Schwarz information criterion.

The first stage of the ARDL bounds approach involves OLS estimation of equation (6) to examine whether there is a long-run relationship between the variables. The F-Wald test is used to determine the joint significance of the coefficients of the lagged levels of the variables. The null hypothesis in the cointegration test is that $H_0 = \phi_1 = \phi_2 = \phi_3 = \phi_4 = 0$, indicating no cointegration, whereas the alternative hypothesis implies that there is at least one $\phi_k \neq 0, k = 1,2,3,4$. The decision on cointegration is based on the critical values obtained from Narayan (2005), which are appropriate for small samples (Sinha & Shahbaz, 2018).

After confirming the cointegration, the next step is to analyze the long- and short-run effects and perform diagnostic tests to verify the stability of the models. The short-run equation is as follows

$$\Delta lnCO_{2,t} = \lambda_0 + \sum_{i=0}^{l_1} \lambda_{1,i} \Delta lnCO_{2,t-1} + \sum_{i=0}^{l_2} \lambda_{2,i} \Delta \mathrm{SECT}_{t-1} + \sum_{i=0}^{l_3} \lambda_{3,i} \Delta \mathrm{HDI}_{t-1} + \sum_{i=0}^{l_4} \lambda_{4,i} \Delta \mathrm{REL}_{t-1} + \theta ECT_{t-1} + \varepsilon_t, \quad (7)$$

where ECT_{t-1} is the error correction term lagged one period, and θ is the parameter indicating the speed of adjustment. The short-run specification is known as the error correction model (ECM). If a long-run relationship exists, then ECT_{t-1} shows how quickly variables return to long-run equilibrium from the short-run. That is, ECT_{t-1} is the speed of adjustment. In this context, θ must be negative and highly significant.

After estimating the models, several diagnostic tests were performed to ensure their validity, including serial correlation, normality, heteroskedasticity, and goodness-of-fit assessments. In addition, the stability of model parameters was examined using the Cumulative Sum Test (CUSUM) and Cumulative Sum of Squares Test (CUSUMSQ) for recursive estimation proposed by Brown et al. (1975).

3. RESULTS AND DISCUSSION

In this study, the ADF and PP tests were performed to determine the integration order of the variables under study before testing for cointegration. These tests were used to ensure that none of the variables had an order of integration beyond I(1). The results of the tests are shown in Table 3, confirming the suitability of the ARDL bound test method for the analysis.

Table 3. Conventional unit root tests

Variables	ADF		PP		Int. order
	level	1st diff	level	1st diff	
CO_2	-2.149	-5.615***	-2.115	-5.729***	I(1)
AVA	-7.367***	-4.210**	-1.209	-4.367**	I(0)/I(1)
IVA	-2.735	-3.818**	-2.820	-5.927***	I(1)
SVA	-1.752	-5.036***	-1.803	-5.036***	I(1)
HDI	-0.209	-4.005**	-0.209	-3.964**	I(1)
REL	-4.192***	-5.225***	-4.192***	-12.089***	I(0)

Note: ** denotes a significance level of 5%, while *** denotes a significance level of 1%. The lag length was chosen based on SIC, with a maximum of six lags considered for ADF. A bandwidth 1 (Newey-West automatic method) with a Bartlett kernel was utilized in the analysis for PP.

The results show that CO_2 emissions, industry and services value-added, and the human development index were non-stationary at the level but became stationary after the first differentiation. In contrast, Table 3 shows that electricity generated from renewable sources was non-stationary at the level and after the first differentiation. The ADF unit root test indicated that agricultural value added is non-stationary at the level and after the first differentiation. In contrast, the PP test indicated it became stationary at the first difference. However, since the results indicate a mixed order of integration (and the results for agricultural value added are inconclusive), the autoregressive distributed lag (ARDL) approach is valid.

Given that the variables under study are characterized as first-order differential stationary sequences, the possibility of a cointegration relation arises. Before the ARDL bound testing, the optimal lag length is investigated by applying different criteria, as shown in Table 4. The results show that lag 1 is the best choice for all three models.

Table 4. ARDL model selection criterion (VAR Lag Order Selection Criteria)

Lag	LogL	LR	FPE	AIC	SIC	HQ
Model A						
0	-44.64128	NA	0.000576	3.891302	4.086322	3.945393
1	36.58644	129.9644*	3.19e-06*	-1.326915*	-0.351815*	-1.056464*
2	51.97703	19.69996	3.75e-06	-1.278163	0.477019	-0.791350
Model I						
0	-34.68821	NA	0.000260	3.095057	3.290077	3.149147
1	40.19053	119.8060*	2.39e-06*	-1.615243*	-0.640142*	-1.344791*
2	54.49219	18.30613	3.06e-06	-1.479375	0.275806	-0.992563
Model S						
0	-39.95962	NA	0.000396	3.516770	3.711790	3.570860
1	33.57042	117.6481*	4.06e-06*	-1.085634	-0.110533*	-0.815182*
2	50.64184	21.85141	4.17e-06	-1.171347*	0.583834	-0.684535

Note: The selected lag order indicated by various criteria is denoted by *. Sequential modified LR test statistic is reported at a 5% level of significance (LR). Other criteria used for lag selection include Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SIC), and Hannan-Quinn information criterion (HQ).

The Schwarz information criterion (SIC) was used to evaluate and compare potential autoregressive distributed lag (ARDL) models, as shown in Figures 1, 2, and 3. The analysis shows that the optimal lag length is determined by the minimum value of SIC, leading to the selection of the ARDL model with a lag structure of (1, 0, 1, 0) for all three models.

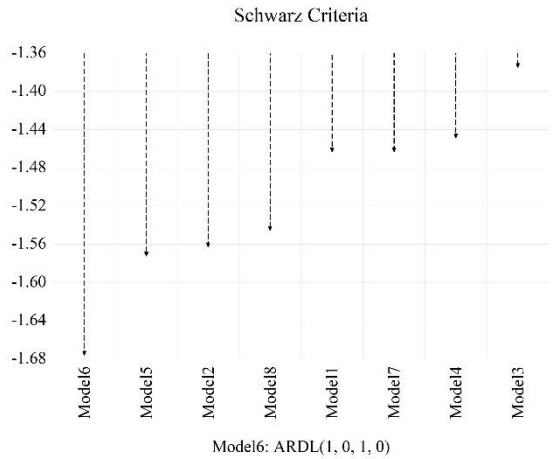


Figure 1. Schwarz information criterion Model A

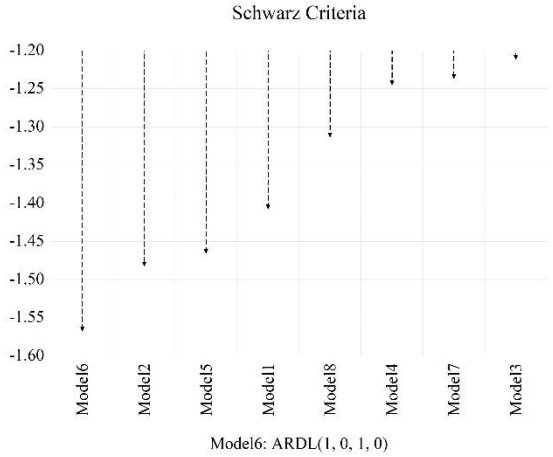


Figure 2. Schwarz information criterion Model I

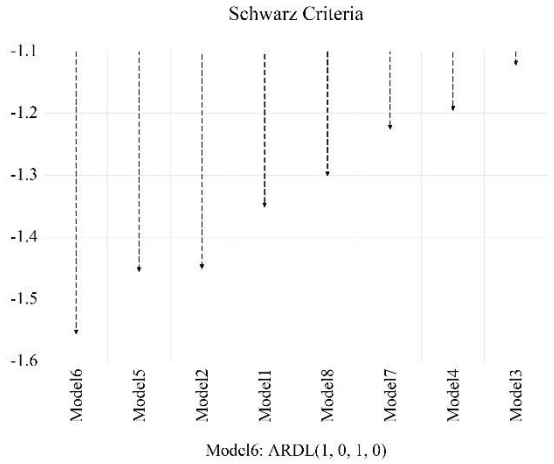


Figure 3. Schwarz information criterion Model S

Upon the establishment of the optimal lag length, which is found to be consistent across all three models, ARDL bound testing is implemented to assess the potential cointegration among CO_2 emissions and its determinants AVA, IVA, SVA, HDI, and REL. The findings are reported in Table 5.

Table 5. ARDL bound test results

Function	Lag Length	F-stat	5% critical values	
			I(0)	I(1)
Model A: $F(CO_2,AVA,HDI,REL)$	1 0 1 0	8.65	3.23	4.35
Model I: $F(CO_2,IVA,HDI,REL)$		7.23		
Model S: $F(CO_2,SVA,HDI, REL)$		7.09		

Analysis of the three models, including Model A: F($lnCO_2$, AVA, HDI, REL), Model I: F($lnCO_2$, IVA, HDI, REL), and Model S: F($lnCO_2$, SVA, HDI, REL), shows that the F statistics exceed the upper critical bound recommended by Narayan (2005) at the 5% significance level. These results rejected the null hypothesis of no cointegration among the examined variables. The results demonstrate a long-run relationship between the variables in all three models for Serbia, spanning from 1995 to 2021.

As this study aims to investigate the relationship between CO_2 emissions and sectoral value addition in Serbia, the long-run estimates obtained using the ARDL approach are presented in Table 6, along with diagnostic tests to ensure the validity of the results.

Table 6. Long-run estimation

Dependent variable CO_2			
Variable	**Model A** Coefficient	**Model I** Coefficient	**Model S** Coefficient
AVA	-0.022305*	-	-
IVA	-	-0.018407	-
SVA	-	-	0.008664
HDI	-3.491512***	-3.118087*	-2.701629
REL	-0.024172**	-0.032066***	-0.032025**
Diagnostic tests	F-stat	F-stat	F-stat
Serial correlation	0.0322	0.1975	0.1863
Heteroskedasticity	0.8380	4.2218	3.9814
Jarque-Bera normality	0.5324	0.6320	0.6604
Ramsey Reset	2.4122	1.9462	1.8007

Note: * represents a significant level of 10%, ** represents a significance level of 5%, while *** denotes a significance level of 1%. Model 1 $R^2 = 0.773$, $\bar{R}^2 = 0.716$. Model 2 $R^2 = 0.747$, $\bar{R}^2 = 0.684$. Model 3 $R^2 = 0.744$, $\bar{R}^2 = 0.680$.

Model A shows that agricultural value added has a negative and significant long-term impact on CO_2 emissions, suggesting that adopting and investing in sustainable agricultural practices could reduce carbon dioxide emissions. Such measures may include financial incentives, training programs, and regulations that encourage the adoption of environmentally friendly techniques. However, caution is warranted as the significance level is 10%. This result contradicts Samargandi's (2017) study on Saudi Arabia and Al Mamun et al. (2014) conclusion on low-income countries. On the other hand, Models I and S show that value added in industry and services is not statistically significant in explaining CO_2 emissions in the long run. This result is consistent with the results of Mitić et al. (2020) for value added in the service sector in the Balkan countries but differs from the results of Mamun et al. (2014), Samargandi (2017), and Mitić et al. (2020) for industry value added. This suggests that factors other than industry and service value addition may be responsible for the country's CO_2 emissions. For example, while the industry and services sectors may not be directly responsible for carbon emissions, they may contribute to them through other channels, such as transportation or energy consumption. In addition, the data used in the analysis may not be comprehensive enough to fully capture the relationship between industry and services value-added and CO_2 emissions in Serbia. Other factors like land-use changes or demographics may contribute to the country's carbon emissions. Overall, the fact that industry and services value-added were not statistically significant in explaining CO_2 emissions in Serbia over the long run underscores the importance of considering multiple factors and their interrelationships when analyzing carbon emissions and formulating environmental policy.

All three models show a significant and negative relationship between the human development index and CO_2 emissions and between the share of electricity from renewable sources and emissions. This suggests that policies aimed at improving human development and increasing the use of renewable energy sources can have positive environmental impacts. In particular, higher levels of human development are associated with greater awareness of environmental issues and a greater willingness to invest in environmentally friendly practices. In addition, countries with higher levels of human development tend to have more advanced economies and greater capacity to invest in clean technologies. On the other hand, by increasing

the share of electricity from renewable sources, Serbia can reduce its dependence on fossil fuels and thus reduce its carbon footprint. These results have important implications for policymakers in Serbia and other countries seeking to improve their environmental performance. In particular, the results suggest that policies to improve human development and increase the share of renewable energy sources can have positive environmental impacts.

Furthermore, policymakers might consider investing in environmental and overall education and health to improve human development and promote using renewable energy sources to reduce carbon emissions. These results are consistent with the findings of Akbar (2021), who demonstrated unidirectional negative causality between CO_2 emissions and HDI for a panel of OECD countries, in contrast to Beith's (2021) findings that HDI has a positive and insignificant effect on CO_2 emissions. Our findings that the share of electricity from renewable sources has a negative and statistically significant effect on CO_2 emissions are confirmed by several studies, e.g., Sarkodie and Ozturk (2020) for Kenya, Al-Mulali et al. (2020) for Ethiopia, and Bölük and Mert (2015) for Turkey.

The diagnostic tests presented in Table 6 confirm the validity of the results. The absence of serial correlation and heteroskedasticity ensures the reliability of the estimates. The normality of the residuals is also confirmed, indicating that the model is accurately specified. Finally, the functional form of the model is verified using the Ramsay RESET test, which shows no problems with the functional form of the model. The cumulative sum test (CUSUM) and the cumulative sum of squares test (CUSUMSQ) confirm that the parameters of long-run models – ARDL(1,0,1,0) – are stable over the study period (Figures 4, 5, and 6). Models A, I, and S are fit because the distribution of their recursive residuals is within bounds.

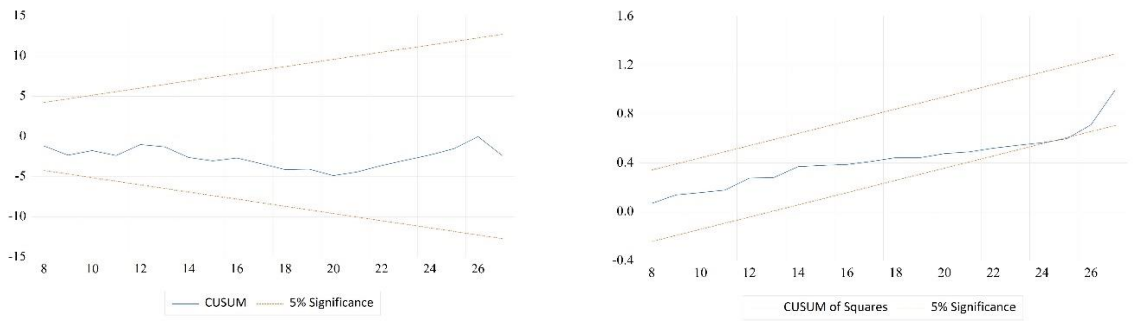


Figure 4. CUSUM and CUSUMQ from long-run estimation – Model A

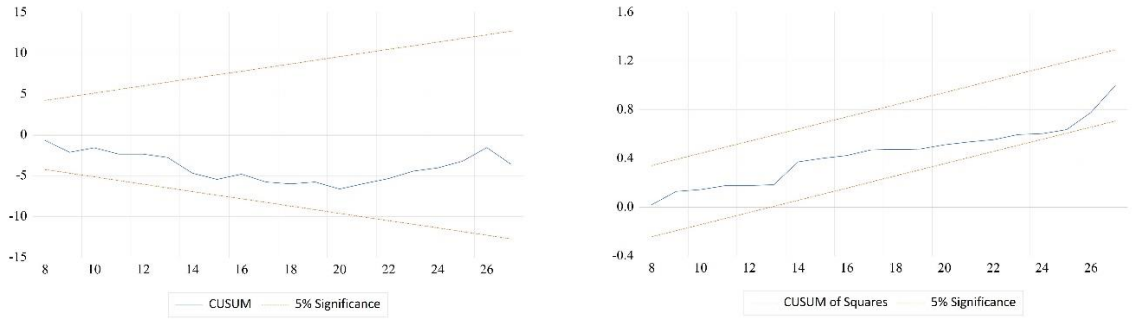


Figure 5. CUSUM and CUSUMQ from long-run estimation – Model I

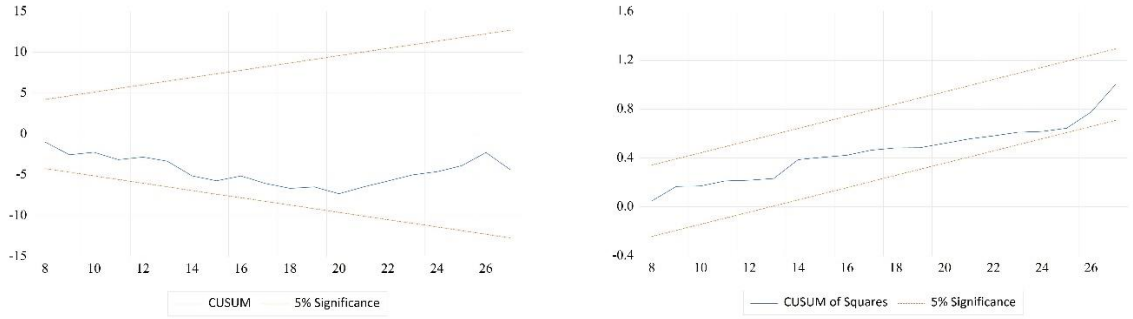


Figure 6. CUSUM and CUSUMQ from long-run estimation – Model S

Table 7 shows the short-run results and the associated diagnostic tests. The results show that similar to the long-run results, REL significantly and negatively impacts CO_2 emissions in all three models. In contrast, HDI significantly and positively affects CO_2 emissions in the short run, as opposed to its long-run effect. However, it is important to note that the statistical significance for the HDI is only 10%, indicating that the results should be interpreted with caution.

Table 7. Short-run estimation

Dependent variable CO_2			
Variable	**Model 1** Coefficient	**Model 2** Coefficient	**Model3** Coefficient
Constant	-0.081068***	-0.081304***	-0.080316***
AVA	-0.013426	-	-
IVA	-	0.005558	-
SVA	-	-	-0.002257
HDI	6.154059*	6.317171*	6.433874*
REL	-0.024709***	-0.025306***	-0.025666***
ECT_{t-1}	-0.562159***	-0.596660***	-0.596919***
Diagnostic tests	F-stat	F-stat	F-stat
Serial correlation	1.3592	0.0964	0.1819
Heteroskedasticity	0.8307	0.4525	0.4135
Jarque-Bera normality	0.9167	0.8160	0.9052
Ramsey Reset	2.5815	4.1231*	4.5762**

Note: * represents a significant level of 10%, ** represents a significance level of 5%, while *** denotes a significance level of 1%. Model 1 $R^2 = 0.796$, $\bar{R}^2 = 0.728$. Model 2 $R^2 = 0.784$, $\bar{R}^2 = 0.712$. Model 3 $R^2 = 0.783$, $\bar{R}^2 = 0.711$.

While the HDI itself is not a direct cause of environmental degradation in Serbia, there is a risk that pursuing higher HDI levels in the short run could prioritize economic growth and development over environmental concerns. Such policies and practices may not be sustainable in the long run. These could include allowing companies to operate with fewer environmental regulations or investing in industries with a high environmental impact.

Moreover, it was found that the sectoral value added in the respective models is not statistically significant in the short run. It is important to emphasize that this does not necessarily mean that these sectors do not contribute to CO_2 emissions in Serbia at all. Rather, it suggests their contribution is not statistically significant in the short run (and for industry and services in the long run). Data availability and quality may also have limited the analysis.

The lack of statistical significance between value added in agriculture, industry, or services and CO_2 emissions in Serbia in the short term suggests that other factors may have a more significant impact on emissions. Identifying these factors and developing effective

policies to mitigate them could be a critical step in reducing emissions and mitigating the effects of climate change in Serbia. For example, energy consumption, particularly the use of fossil fuels for energy production, is a significant contributor to CO_2 emissions. The results of this paper support this, as the increasing electricity from renewable energy sources improves environmental quality in Serbia in both the short and long term. Transportation is another significant source of CO_2 emissions, and changes in transportation patterns could significantly affect emissions in the short run. Finally, weather patterns could also affect CO_2 emissions, with extreme weather events leading to increased energy consumption or changes in business activities. Further research is needed to identify the leading causes of emissions in Serbia and to formulate effective measures to address them.

The error correction term, which is statistically significant with a negative sign and a value of 0.56%, 0.60%, and 0.60% for models A, I, and S, respectively, confirms the presence of a long-run relationship between the variables in the study. The value of the error correction term indicates that any deviation from the equilibrium point in CO_2 emissions will converge to it in the long run. In addition, the absence of serial correlation and heteroskedasticity confirms the reliability of the estimates, while the normality of the residuals confirms that the model is accurately specified.

However, there were some issues regarding the overall stability of Models I and S, as shown by Ramsay's RESET test. Although model A was satisfactory, we retained the models I and S because of good results on other diagnostic tests. Additionally, the CUSUM and CUSUM square tests indicate that the estimated parameters are stable over the study period, as shown in Figures 7-9.

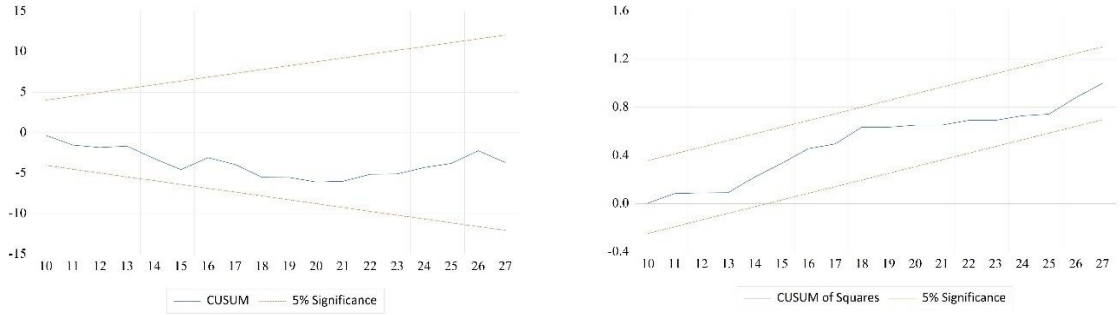


Figure 7. CUSUM and CUSUMQ from short-run estimation – Model A

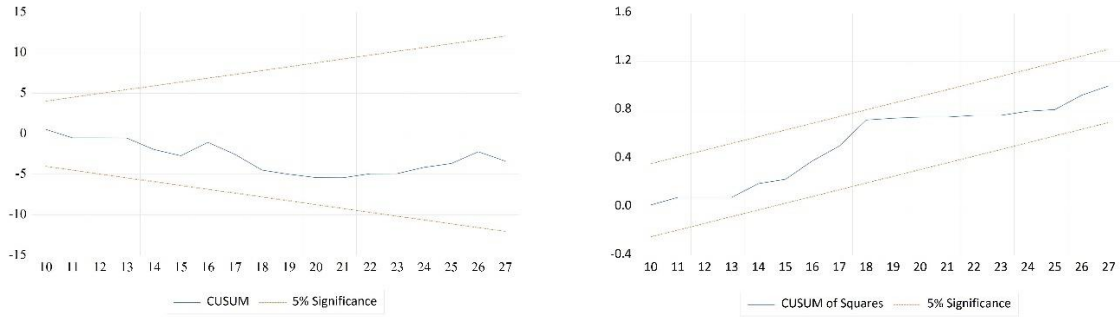


Figure 8. CUSUM and CUSUMQ from short-run estimation – Model I

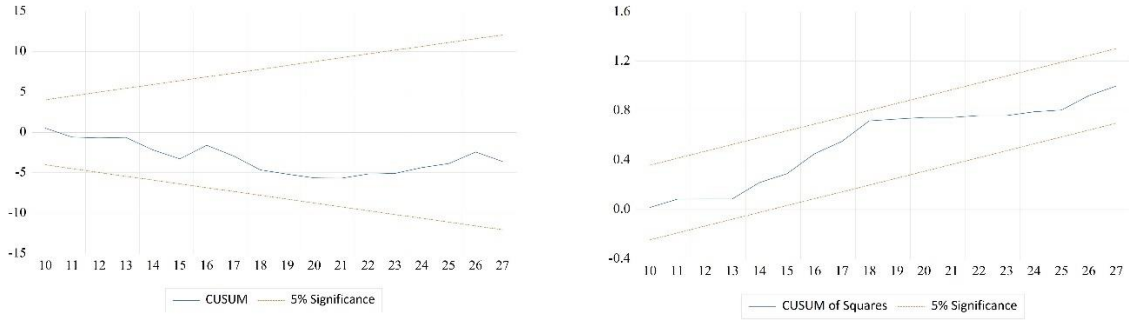


Figure 9. CUSUM and CUSUMQ from short-run estimation – Model S

4. CONCLUSION

This study investigates the relationship between CO_2 emissions and sectoral value added in Serbia using the autoregressive distributed lag (ARDL) approach. The study also included the human development index and the share of electricity generated from renewable sources. The analysis shows a long-term relationship between the variables in all three models for Serbia, covering 1995 to 2021. Therefore, this study investigated the relationship between value added in agriculture, industry and services and CO_2 emissions in Serbia using three different models, respectively. The study concludes that agricultural value added has a significant and negative impact on CO_2 emissions in the long term, suggesting that agriculture can improve environmental quality and that adopting sustainable agricultural practices could help reduce carbon dioxide emissions. On that note, policymakers could consider investing in research and development to identify more efficient and environmentally friendly farming methods and provide incentives for farmers to adopt these practices. However, caution is needed as the significance level is 10%. On the other hand, industry and services value added are not statistically significant in explaining CO_2 emissions, suggesting that other factors could contribute to CO_2 emissions in Serbia, such as transportation or energy production and consumption.

The study also shows that improving human development and increasing the share of electricity from renewable energy sources have a significant and negative relationship with CO_2 emissions. Therefore, policies to improve human development and increase the share of renewable energy sources in electricity generation have positive long-term environmental impacts. Policymakers could consider investing in environmental and general education and health to improve human development and promote using renewable energy sources to improve environmental quality. To increase the share of renewable energy sources in electricity generation, policymakers could consider educating on, improving and implementing feed-in tariffs on a larger scale or other policy instruments that encourage investment in renewable energy projects.

The results of this study have important policy implications for Serbia and other countries seeking to improve their environmental performance. Policymakers need to consider numerous factors and their interrelationships when analyzing carbon emissions and formulating environmental policies. Therefore, policies should primarily focus on improving human development and increasing the use of renewable energy to reduce carbon emissions.

In contrast, the short-term results of the study show that HDI has a significant positive effect on emissions in the short term, albeit with a lower significance level, while electricity from renewable sources has a significant and negative effect on CO_2 emissions in all three models. However, the lack of statistical significance between sectoral value added and CO_2

emissions in the short run suggests that other factors may contribute more to CO_2 emissions in Serbia. The statistically significant error correction term confirms the presence of a long-run relationship between the variables, suggesting that any deviation from the equilibrium point in CO_2 emissions will converge to that point in the long run. Therefore, policymakers should focus on promoting the use of renewable energy sources and improving human development to achieve long-term environmental goals while considering other important factors that contribute to carbon emissions in the short term.

This study adds to the growing body of literature on the relationship between CO_2 emissions and economic growth and development. The findings suggest that adopting sustainable agricultural practices and increasing the use of renewable energy sources for electricity generation have a significant and negative impact on CO_2 emissions in Serbia in the long run. However, caution is warranted as there are limitations to this study. For instance, the focus on CO_2 emissions as the only indicator of environmental quality is a constraint that needs to be addressed by examining the roles of renewable and non-renewable energy sources from a broader perspective. Caution is necessary when interpreting the findings of this study, as different countries may exhibit unique economic characteristics that could influence the results. Therefore, it may not be appropriate to generalize the conclusions of this study to other countries. Despite these limitations, this study provides theoretical and practical implications that can guide policymakers in reducing emissions. Further research may extend this work by examining the impact of technological innovation, financial development, trade openness, air and water quality, biodiversity, and land use change on environmental quality. A more holistic approach to environmental policy could lead to better outcomes in terms of sustainable development.

Acknowledgements. This research has been financed by the Ministry of Science, Technological Development and Innovations of the Republic of Serbia.

REFERENCES

Akbar, A., Hussain, A., Akbar, A., & Ullah, I. (2021). The dynamic association between healthcare spending, CO_2 emissions, and human development index in OECD countries: evidence from panel VAR model. Environment, Development and Sustainability, 23(7), 10470–10489.

Al Mamun, M., Sohag, K., Mia, M. A. H., Uddin, G. S., & Ozturk, I. (2014). Regional differences in the dynamic linkage between CO_2 emissions, sectoral output and economic growth. Renewable and Sustainable Energy Reviews, 38, 1-11.

Al-Mulali, U., Solarin, S. A., & Salahuddin, M. (2020). The prominence of renewable and non-renewable electricity generation on the environmental Kuznets curve: A case study of Ethiopia. Energy, 211, 118665.

Andrew, R. M., & Peters, G. P. (2022). The Global Carbon Project's fossil CO_2 emissions dataset. https://doi.org/10.5281/zenodo.7215364 (Accessed on March 18, 2022)

Bankwatch Network. (2021). The energy sector in Serbia. Bankwatch. Retrieved from https://bankwatch.org/beyond-fossil-fuels/the-energy-sector-in-serbia (Accessed on March 8, 2023)

Bieth, R.C.E. (2021). The Influence of Gross Domestic Product and Human Development Index on CO_2 Emissions. Journal of Physics, 1808(1), 012034.

Boamah, K. B., Du, J., Xu, L., Nyarko Mensah, C., Khan, M. A. S., & Allotey, D. K. (2020). A study on the responsiveness of the environment to international trade, energy

consumption, and economic growth. The case of Ghana. Energy Science & Engineering, 8(5), 1729-1745.

Bölük, G., & Mert, M. (2015). The renewable energy, growth and environmental Kuznets curve in Turkey: An ARDL approach. Renewable and Sustainable Energy Reviews, 52, 587-595.

Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for Testing the Constancy of Regression Relationships Over Time. Journal of the Royal Statistical Society: Series B (Methodological), 37(2), 149-163.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74(366a), 427-431.

EIA. (2021). Serbia. International - U.S. Energy Information Administration (EIA). Retrieved from https://www.eia.gov/international/data/country/SRB (Accessed on March 18, 2023)

European Commission. (2022). Serbia. European Neighbourhood Policy and Enlargement Negotiations. Retrieved from https://ec.europa.eu/neighbourhood-enlargement/enlargement-policy/negotiations-status/serbia_en

Friedlingstein, P., O'Sullivan, M., Jones, M. W., Andrew, R. M., Gregor, L.,… & Zheng, B. (2022). Global carbon budget 2022. Earth System Science Data, 14(11), 4811–4900.

Global Carbon Atlas. (2023). CO_2 Emissions. Retrieved from http://www.globalcarbonatlas.org/en/CO2-emissions (Accessed on March 18, 2023)

Hall, B. R., Crotwell, A. M., Kitzis, D., Mefford, T., Miller, B. L., Schibig, M., & Tans, P. P. (2021). Revision of the World Meteorological Organization Global Atmosphere Watch (WMO/GAW) CO_2 calibration scale. Atmospheric Measurement Techniques, 14(4), 3015–3032.

Hossain, M. S. (2011). Panel estimation for CO_2 emissions, energy consumption, economic growth, trade openness and urbanisation of newly industrialised countries. Energy Policy, 39(11), 6991-6999.

IPCC. (2018). Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Retrieved from https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf (Accessed on March 17, 2023)

Kirikkaleli, D., Abbasi, K. R., & Oyebanji, M. O. (2023). The asymmetric and long-run effect of environmental innovation and CO_2 intensity of GDP on consumption-based CO_2 emissions in Denmark. Environmental Science and Pollution Research, 30, 50110–50124.

Mitić, P., Kostić, A. Ž., Petrović, E., & Cvetanović, S. (2020). The Relationship between CO_2 Emissions, Industry, Services and Gross Fixed Capital Formation in the Balkan Countries. The Engineering Economics, 31(4), 425–436.

Narayan, P. K. (2005). The saving and investment nexus for China: evidence from cointegration tests. Applied Economics, 37(17), 1979-1990.

Narayan, P. K., & Smyth, R. (2005). Electricity consumption, employment and real income in Australia evidence from multivariate Granger causality tests. Energy Policy, 33(9), 1109-1116.

NOAA. (2021). 2020 was Earth's 2nd-hottest year, just behind 2016. National Oceanic and Atmospheric Administration. Retrieved from https://www.noaa.gov/news/2020-was-earth-s-2nd-hottest-year-just-behind-2016 (Accessed on March 7, 2023)

Odhiambo, N. M. (2009). Energy consumption and economic growth nexus in Tanzania: An ARDL bounds testing approach. Energy Policy, 37(2), 617-622.

Pesaran, M. H., Shin, Y., & Smith, R. D. (2001). Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289–326.

Pesaran, M., & Shin, Y. (1999). An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis. 371-413 In S. Strøm (Ed.), Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium (Econometric Society Monographs), Cambridge: Cambridge University Press.

Peters, G. P., Minx, J. C., Weber, C. R., & Edenhofer, O. (2011). Growth in emission transfers via international trade from 1990 to 2008. Proceedings of the National Academy of Sciences of the United States of America, 108(21), 8903–8908.

Petrović-Ranđelović, M., Mitić, P., Zdravković, A., Cvetanović, D., & Cvetanović, S. (2020). Economic growth and carbon emissions: evidence from CIVETS countries. Applied Economics, 52(16), 1806-1815.

Phillips P.C., & Perron P. (1988). Testing for a unit root in time series regression. Biometrika, 75(2), 335-346.

Ritchie, H., Roser, M., & Rosado, P. (2022). Energy. Our World in Data. Retrieved from https://ourworldindata.org/energy (Accessed on Februry 25, 2023)

Roser, M. (2014). Human Development Index (HDI). Our World in Data. Retrieved from https://ourworldindata.org/human-development-index (Accessed on Februry 5, 2023)

Samargandi, N. (2017). Sector value addition, technology and CO_2 emissions in Saudi Arabia. Renewable & Sustainable Energy Reviews, 78, 868–877.

Sarkodie, S. A., & Ozturk, I. (2020). Investigating the Environmental Kuznets Curve hypothesis in Kenya: A multivariate analysis. Renewable and Sustainable Energy Reviews, 117, 109481.

Shahbaz, M., Jam, F. A., Bibi, S., & Loganathan, N. (2016). Multivariate Granger causality between CO_2 emissions, energy intensity and economic growth in Portugal: evidence from cointegration and causality analysis. Technological and Economic Development of Economy, 22(1), 47-74.

Sinha, A., & Shahbaz, M. (2018). Estimation of Environmental Kuznets Curve for CO_2 emission: Role of renewable energy generation in India. Renewable Energy, 119, 703–711.

The World Bank. (2021). GDP growth (annual %) - Serbia. World Development Indicators. Retrieved from https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=RS (Accessed on Februry 22, 2022)

The World Bank. (2023). World Bank Open Data. Retrieved from https://data.worldbank.org/ (Accessed on Februry 5, 2023)

UNFCCC. (2017). Second National Communication of the Republic of Serbia under the United Nations Framework Convention on Climate Change. Retrieved from https://www.klimatskepromene.rs/wp-content/uploads/2017/09/SNC_eng.pdf (Accessed on Februry 22, 2023)

Wang, Y., Li, L., Kubota, J., Han, R., Zhu, X., & Lu, G. (2016). Does urbanisation lead to more carbon emission? Evidence from a panel of BRICS countries. Applied Energy, 168, 375-380.

WMO. (2020). World meteorological organisation, united in science - High-level synthesis report of latest climate science information convened by the Science Advisory Group of the UN Climate Action Summit 2019. Retrieved from https://library.wmo.int/doc_num.php?explnum_id=9937 (Accessed on January 2, 2023)

WMO. (2022). Provisional State of the Global Climate in 2022. World Meteorological Organization. Retrieved from https://public.wmo.int/en/our-mandate/climate/wmo-statement-state-of-global-climate (Accessed on January 22, 2023)

Yaseen, M. R., Ali, Q., & Khan, M. T. I. (2018). General dependencies and causality analysis of road traffic fatalities in OECD countries. Environmental Science and Pollution Research, 25(20), 19612-19627.

Zambrano-Monserrate, M. A., Silva-Zambrano, C. A., Davalos-Penafiel, J. L., Zambrano-Monserrate, A., & Ruano, M. A. (2018). Testing environmental Kuznets curve hypothesis in Peru: The role of renewable electricity, petroleum and dry natural gas. Renewable and Sustainable Energy Reviews, 82, 4170-4178.

Volume XIX, Issue (1) (2023) p31-p42

International May Conference on Strategic Management

TO BE OR NOT TO BE AN ENTREPRENEUR… THE ANALYSIS OF ENTREPRENEURIAL INTENTIONS AMONG STUDENTS

Milica Veličković, Daniel Pavlov[2], Silvia Puiu[3]

[1]University of Belgrade, Technical faculty in Bor, Serbia; [2] University of Ruse "Angel Kunchev", Bulgaria; [3]University of Craiova, Romania

Abstract: This study, as a part of a larger research, aims to highlight the role of Family support and Emotional Intelligence as one of the important determinants of the students' decision to enter into entrepreneurship. For achieving this objective, a special questionnaire was created. As a method of analysis partial least squares structural equation modelling (PLS-SEM) was used. The sample was formed of 593 students from three universities (Belgrade, Ruse and Craiova). The results reveal that both factors have a positive, but not a significant relationship with entrepreneurial intentions. In addition, in order to examine whether there are significant differences in the path coefficients between these three countries, partial least squares multigroup analysis (PLS-MGA) was employed. According to the results of MGA, it can be said that Family support has a stronger impact on students' Entrepreneurial intentions in Serbia and Romania, compared to Bulgaria. Regarding Emotional Intelligence, the situation is the same. The greater impact of this variable is visible in Serbia, compared to Bulgaria and Romania.

Keywords: entrepreneurial intentions, family support, emotional intelligence, MGA

1. INTRODUCTION

There is general agreement on the importance of promoting entrepreneurship for stimulating economic development and youth employment. Entrepreneurship is recognized as a key competence in the process of lifelong learning, which is why entrepreneurial education is promoted and implemented in almost all educational systems. It has become a very important topic in the last two decades in all transition countries and in different ways it has been integrated into their strategic and legislative framework (Mohar et al., 2007).

Young people are an extremely important element in the future development of every country's economy. The moment young people understand the importance of entrepreneurship and are ready to enter entrepreneurial activities, the unemployment rate will fall and the world economy will experience great progress. Therefore, it is clear that the positive intention and attitude that students and graduates have towards entrepreneurship, which are built through the adoption of certain values, but also knowledge at the faculty, are important to increase the number of self-employed people in the future (Đorđević & Bogetić, 2010). However, students' interest in entrepreneurship after graduation is traditionally low (Stamboulis & Barlas, 2014). A big challenge for both professors and responsible people in a country is how to motivate these young people to get involved in entrepreneurial activities and to use the knowledge and skills they have acquired at the faculty.

Entrepreneurial intentions appear to be good indicators of future entrepreneurial behavior, according to recent empirical findings (Van Gelderen et al., 2015; Shirokova et al., 2016). Bearing in mind the crucial role of entrepreneurial intention in the early stage of the entrepreneurial process, a lot of studies were trying to analyze factors which affect it (Schlaegel & Koenig, 2014; Linán & Fayolle, 2015).

Entrepreneurial intention refers to "one's desire, wish and hope of becoming an entrepreneur" (Isiwu & Onwuka, 2017). One of the first theories trying to explain entrepreneurial intentions was Ajzen's Theory of Planned Behavior (1991). According to this theory, intention arises as a result of the action of three factors: Attitude towards a given behavior, Subjective norms and Perceived behavioral control. However, one of the biggest shortcomings of this theory was the fact that entrepreneurial intention is such a complex phenomenon, that it can't be explained with only three constructs. So, the list of potential antecedents of entrepreneurial intentions began to spread.

A lot of studies were trying to uncover the factors which influence the intention of students in Serbia to choose entrepreneurship as a career option (Nikolić, et al., 2017; Dragin et al., 2022; Ognjenović, 2022). In their paper, Djordjevic et al. (2021), used linear regression analysis in order to analyze groups of predictors, such as close social environment, awareness of incentive means, and environment assessment on entrepreneurial intentions of high school and university students. They found out that only students' attitudes affect their intention to start their own businesses. In addition, this effect was negative, meaning that the more positive attitudes, the less likely would students have entrepreneurial intentions. This is probably the study with the largest sample (5670 respondents), and it was conducted for almost 10 years (2009-2019). Rajkovic et al. (2020) analyzed how different variables (age, gender, family background and financial opportunities) affect the entrepreneurial intentions of students from the University of Belgrade and the University of Novi Sad. According to their results, the most important variable for entrepreneurial intentions is financial opportunity to start a new business. Also, they concluded that men have more pronounced entrepreneurial intentions than women.

Much more research was done in Bulgaria (Dimitrova et al., 2012; Hristova & Wołejsza, 2020; Yordanova et al., 2020) and Romania (Popescu et al., 2014; Dodescu et al., 2019; Fanea-Ivanovic & Baber, 2021; Rusu et al., 2022; Trif et al., 2022; Nitu-Antonie et al., 2023). In their work, Yordanova et al. (2020) aimed to study the role of the university in the development of technopreneurial intentions in a sample of Bulgarian STEM students. Their results show that students in universities with better research in their scientific field of study are more likely to exhibit technopreneurial intention. In the end, they argue that social support, gender and risk-taking are not important factors for technopreneurial intentions. Dodescu et al. (2019), conducted research tests according to the theory of planned behavior if there is a positive correlation between students' experiences (exposure to entrepreneurial models, work experience and intuition of trigger-events), gender, the residential environment (urban, rural), the family origin and entrepreneurial intentions. The results have shown that correlation between students' experience and intention is very weak. Rusu et al. (2022) highlight the role of access to finance as one of the determinants of the students' decision to enter into entrepreneurship. The results reveal that access to finance is a significant determinant and that female students' entrepreneurial intentions are influenced by the availability of bank loans and personal savings, while in the case of male students - only by the availability of funds coming from family and friends.

2. THEORETICAL BACKGROUND

Many studies have been conducted in higher education institutions with the aim of discovering specific factors that influence young people's desire to start their own businesses after graduation (Crane, 2014; Misoska et al., 2016; Nabi et al., 2018; Turulja et al., 2020). The aim of this work was to contribute to the existing literature by examining how Family support and Emotional Intelligence influence the Entrepreneurial Intentions of students.

2.1. Family support and Entrepreneurial intentions

According to Sperber and Linder (2018), the sense of support and the amount of effort that the entrepreneur is willing and able to put forward are what shape their entrepreneurial ambitions. The social environment of the individual is a strong predictor of entrepreneurial intention (Rokhman & Ahamed, 2015), especially among young people (Siu & Lo, 2013). A person's own attitude toward entrepreneurship is likely to be influenced by the attitude of its reference person and if that attitude is positive, than is expected that an individual will also develop positive attitude (Pejic Bach et al., 2018). According to Gelard and Selah (2011), reference people include close relatives, friends, and co-workers.

Previous studies have proven the significant influence of the family in supporting young people in starting entrepreneurial businesses. The significant role of the family stems from the inexperience of young people in performing entrepreneurial activities, lack of knowledge about entrepreneurship (Nielsen & Lassen, 2012), lack of capital and difficulties in obtaining financial support such as loans and credits for starting a business (Ozgen & Minsky, 2013). Family members frequently bring resources to the business, such as time, labor recommendations, knowledge, information, or emotional support (Dyer, 2006). That is why it can be said that the support of the family is important both emotionally and materially.

H_1: Family support is positively related to entrepreneurial intentions.

2.2. Emotional intelligence and Entrepreneurial intentions

The term emotional intelligence refers to the „mental processes involved in the recognition, use, understanding, and management of one's own and others' emotional states to solve problems and regulate behavior"(Mayer & Salovey, 1997). A large number of studies suggest that emotional intelligence is directly or indirectly positively related to entrepreneurial intentions (FakhrEldin, 2017; Ingram et al., 2017; Zhou & Bojica, 2017).

Although the importance that students' emotional intelligence has on the development of their entrepreneurial intentions has long been recognized, very few studies have dealt with this issue (Zampetakis, et al., 2009a; Davis & Peake, 2014; Javed et al., 2016; Tiwari et al., 2017).

Many studies have shown that people who have a higher level of emotional intelligence are more satisfied with their jobs, have better relationship with other people and, in general, it has a positive effect on their mental and physical state (O'Boyle et al., 2011). In their research, Madar et al., (2019) examined how four components of emotional intelligence (Self-Emotions Appraisal, Others-Emotions Appraisal, Regulations of Emotions, and Use of Emotions to facilitate performance) influence the emergence of entrepreneurial intentions among students in Israel. This study suggests that the variable Emotional intelligence plays an important role in the formation of students' entrepreneurial intentions and has a positive impact. Following this rationale, we propose the following hypothesis:

H_2: Emotional intelligence is positively related to entrepreneurial intentions.

According to hypotheses H_1 and H_2, the theoretical model has been defined for the influence of observed variables on the entrepreneurial intentions among university students (Figure 1).

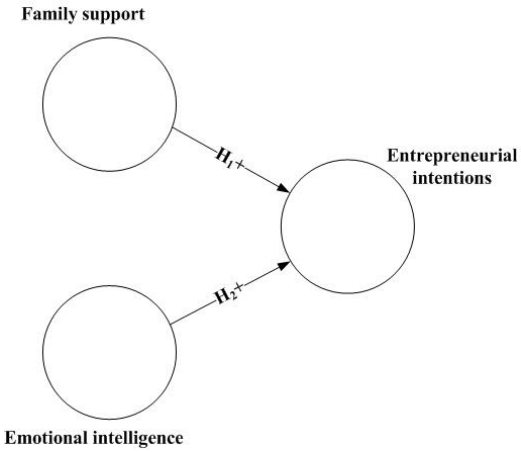


Figure 1. Theoretical model

3. METHODOLOGY

3.1. Sample

The research was conducted within the international INTERGEN project (The intergenerational family businesses as a stress management instrument for entrepreneurs). The project was initiated by the University of Ruse, Bulgaria. One of the objectives of this Project was to determine the factors which can significantly help to explain the students' intention to engage in any entrepreneurial activity.

The sample consists of 593 volunteer students of the University of Ruse (Bulgaria, 48.73%), Technical faculty in Bor, University of Belgrade (Serbia, 17.54%) and the University of Craiova (Romania, 33.73%), aged between 18 and 35. Data were collected during the school year 2020/2021. The sample included only those students who attended Entrepreneurship courses during that or previous academic years and who were willing to participate in the survey. Participants completed a questionnaire that included measures of entrepreneurial intention, family support and emotional intelligence. The compilation of the questionnaire required approximately 20 minutes. The authors personally conducted the survey, trying to explain every issue of the questionnaire, in that way all misunderstandings were avoided.

The research included students of both genders, different ages and different fields of study. The demographic characteristics of the sample are shown in Table 1: they were mostly females, in the field of engineering and business, without a family background.

Table 1. Demographic characteristics of the sample

Respondents' characteristics			Frequency (%)		
			Serbia	Bulgaria	Romania
Gender	Male		28.8	23.9	23.0
	Female		71.2	76.1	77.0
Family business experience	Yes		11.5	22.5	19.5
	No		86.5	71.6	79.5
	It is not active any more		1.9	5.9	1.0
Study level	Bachelor student		88.5	34.3	35.0
	Finished BSc studies		1.9	23.9	6.5
	Master student		9.6	4.8	5.3
	Finished MSc studies		0	37.0	5.5
Respondents			104	289	200

3.2. Measures

For the purpose of this Project, a special questionnaire was developed. Five-point Likert scale was used to assess the answers, where 1 means „I completely disagree", and 5 means „I completely agree". The indicators used to measure the latent variables and the corresponding indicators are shown in Table 2.

Table 2. Latent constructs and measurement indicators.

Variable	Indicators
Family support (FS)	Whenever I have a problem, I share it with my family and friends
	To start my business I need the support of my family and friends
	I can convince my parents to provide me with seed capital for my business
	If my parents were contractors or partners, I would feel more secure
Emotional intelligence (EmI)	I can say that I am satisfied with my lifestyle
	Compared to my friends, I consider myself a much happier person than them
	I can freely say that I am a happy person
	I have the support of my friends when I'm in trouble
Entrepreneurial intentions (EI)	I would like to start a joint business with my relatives or friends
	I would include my parents in my business as employees
	I would include my parents in the business as partners or contractors
	I would rather improve the family business than start a new one

The structural and measurement models are estimated using partial least squares structural equation modelling (PLS-SEM), an exploratory multivariate data analysis technique designed by Wold (1982). The structural models are assessed by examining coefficients of determination and the significance of the path models. The analyses were performed separately for each of the three models (Serbia, Bulgaria and Romania) as full measurement invariance should be established before pooling the data (Hair et al., 2017).

To examine whether there are significant differences in the path coefficients between these three countries, partial least squares multigroup analyses (PLS-MGA) and permutation tests were also conducted. The analyses were performed using the SmartPLS software (Ringle et al., 2022).

Before running a multiple-group analysis (MGA), it is important to conduct invariance testing to avoid potential misspecification bias and misleading results. For accessing measurement invariance, Henseler et al. (2016) recommended the three-step MICOM (Measurement Invariance of Composite Models) method:

1. "the configural invariance assessment (same algorithm for both groups)".
2. "the establishment of compositional invariance assessment" and
3. "an assessment of equal means and variances"

This technique enables researchers to identify whether the parameters of the structural model and measurement model are equivalent across two or more groups (Sarstedt et al., 2011). If one failed to establish invariance, it would be difficult to determine whether the differences observed were due to true differences (Hult et al., 2008). If configural invariance and compositional invariance are established partial measurement invariance is confirmed. After that, the path coefficient estimates between groups can be compared.

In this study, configural invariance is established for all latent constructs. Compositional invariance, and thus partial measurement invariance, could however not be established for FS (Serbia versus Romania).

4. RESULTS

4.1. Measurement model

Measurement model assessment included establishing construct reliability and validity. Construct reliability was established through Cronbach's Alpha. Construct reliability and convergent validity for the country-specific sample are presented in Table 3. The Cronbach alpha values for all the constructs were higher than the recommended value of 0.700 for the sample from Bulgaria and Romania, but somewhat lower for Serbia. For the assessment of convergent validity, the Average Variance Explained (AVE) was used. The data from Table 3 indicate that convergent validity is also achieved, taking into account that AVE for all constructs is above the threshold of 0.5 (Fornell & Larcker, 1981).

Table 3. Reliability and convergent validity

	Serbia		Bulgaria		Romania	
Variable	Alpha	AVE	Alpha	AVE	Alpha	AVE
Family support (FS)	0.685	0.766	0.796	0.900	0.741	0.855
Emotional intelligence (EmI)	0.660	0.879	0.710	0.922	0.702	0.892
Entrepreneurial intention (EI)	0.734	0.707	0.825	0.855	0.798	0.814

4.2. Structural models

The results of the PLS-SEM algorithm and bootstrapping procedures are shown in Figure 2. The results show consistent significant positive coefficients between variables Family support and Entrepreneurial intentions in the case of Bulgarian and Romanian students, and positive, but not significant relationship between other variables.

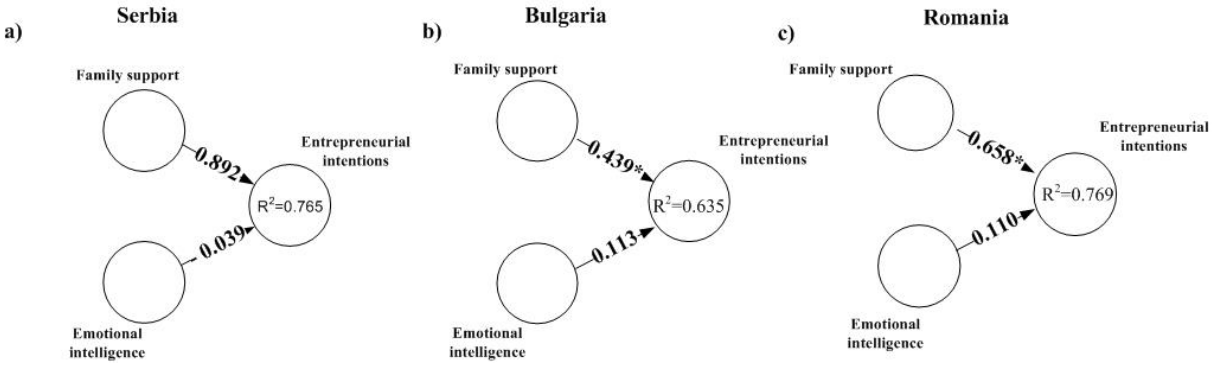


Figure 2. The results of PLS-SEM analysis for a) Serbia, b) Bulgaria, c) Romania

The consistent insignificant effect of Emotional intelligence is remarkable, which indicates that positive personal emotions, appreciation of own and other emotions, do not impact the entrepreneurial intentions of the study population. As shown in Figure 2 the hypothesized model is able to explain between 63 % and 77 % of the variance in Entrepreneurial intentions.

4.3. Multigroup analyses

To examine whether significant differences in path coefficients exist between three countries, we used three pairwise PLS-MGA (Chin and Dibbern, 2010). As shown in Table 4, the results show that two path coefficients significantly increased between Serbia and Romania, and Bulgaria and Romania. However, the results of MGA between Serbia and Romania (relationship FS versus EI) have shown that partial measurement invariance was not established, and because of that these results are not going to be interpreted.

Table 4. The results of multigroup analyses.

	Serbia vs Bulgaria		Serbia vs Romania		Bulgaria vs Romania	
	β1 - β2	p-value	β1 - β3	p-value	β2 - β3	p-value
FS → EI	0.066	0.523	-0.153*	0.043	-0.219	0.000
EmI → EI	0.058	0.572	0.061	0.496	0.002	0.979

*Numbers cannot be interpreted due to the lack of partial measurement invariance.

According to the results of MGA, it can be said that Family support has a stronger impact on students' Entrepreneurial intentions in Serbia and Romania, compared to Bulgaria. Regarding Emotional Intelligence, the situation is the same. The greater impact of this variable is visible in Serbia, compared to Bulgaria and Romania. However, these differences are not significant.

The abovementioned analyses were repeated using permutation tests, which lead to comparable results and identical conclusions

5. DISCUSSION OF THE RESULTS

In the last few years, in almost all transition and developing countries, the focus has been on entrepreneurship. In the university curriculum, Entrepreneurship as a subject was introduced, not only in faculties dealing with management studies but also in others. The great potential that entrepreneurship has for the development of the economy of a country, as well as

no possibility of employment in existing companies, has been recognized by governments. The entrepreneurial culture in observed countries seems to be still in the development phase. As it can be seen (Table 1) the number of students with an entrepreneur in their family is still low.

However, according to Global Entrepreneurship Monitor, the percentage of the population (ages between 18-64) who are latent entrepreneurs and who intend to start a business within three years is very low. It is hard to compare data since they do not refer to the same year, but based on the most recent data this percentage in Romania is 9.72 (2021), Bulgaria 3.91(2018) and Serbia 22.20 (2009), which is very disappointing. Maybe the reason for such low numbers lies in the fact that all three countries belong to collectivistic cultures, with high uncertainty avoidance. The members of these cultures usually think that society is responsible for their future, and they often expect that government need to secure them employment, after graduation. In addition, high uncertainty avoidance means that its members are not ready for risk-taking, which is one of the main characteristics of entrepreneurship.

Based on the obtained results, it is evident that students who have support from their closest relatives and parents have a greater desire to involve in entrepreneurial activities. If one takes a look at indicators of variable Entrepreneurial Intentions, it can be seen that they all point to intentions to start or continue a family business. That is why these results are not surprising. It is totally logical to expect that individuals who have a strong connection with their relatives are planning to include them in their future business, either as partners or contractors.

Although a positive path coefficient between Emotional intelligence and Entrepreneurial intentions suggests that hypothesis 2 was confirmed, such low value and above all statistically insignificant implies that positive personal emotions, do not impact the entrepreneurial intentions of the study population in an expected way. Which is inconsistent with similar studies (Mortan et al., 2014; Madar et al., 2019).

The results of MGA have shown that Family support has a stronger impact on students' Entrepreneurial intentions in Serbia and Romania, compared to Bulgaria. It was impossible to compare the path coefficient of Family support and Entrepreneurial Intentions between Serbia and Romania, given that partial measurement invariance was not established.

An interesting fact is that for the first time, in 2021, Bulgaria took a part in GUESSS Project. The Project started in 2003, and among many, one of the aims is to measure students' intention to become an entrepreneur. What is even more interesting is that of seven universities which participated in this survey, the University of Ruse was one of them. So, in some way, we can compare the obtained results from these two studies (current and GUESSS study). The results obtained in the frame of the GUESSS project have shown that students from this university perceive the atmosphere at the university as one of the main factors which determine their entrepreneurial intention. The University of Ruse was ranked as the second most entrepreneurially supportive university in Bulgaria (Hadjitchoneva, 2021). Unfortunately, similar data for Serbia and Romania are not available.

One of the main implications of this study is the comprehension that the cultivation of emotional intelligence among students will probably raise the chance to have more entrepreneurs in the future. Considering the very large impact that entrepreneurship has on national economies, it is the duty of faculties and other educational institutions to discover the factors that contribute to its development and work to strengthen them. It is necessary to design curricula that will develop and support the entrepreneurial intentions of students, either to start new businesses or to continue the family business.

The main research limitation embeds the fact that the sample included only students from three universities in Serbia, Bulgaria and Romania, hence partially restraining a generalization of the results. However, this study contributes significantly to existing literature with new empirical evidence highlighting that family support and emotional intelligence continue to be

very important in framing students' entrepreneurial intentions. Future research aims to expand the sample and consider students from various universities in other European countries, in a comparative approach. Another limitation was the methodology and usage of the self-created questionnaire, which can often make serious problems, regarding the reliability of indicators, which was not the case in this study. And the last limitation could be unequal study samples between countries (the Bulgarian sample is more than double of the Serbian), which could cause a problem during MGA as permutation tests are sensitive to sample size. The permutation analyses were repeated 10 times each using a different random subsample for Bulgaria.

6. CONCLUSION

The main purpose of this paper was to analyse the role of family support and emotional intelligence in determining the students' intentions to become entrepreneurs in three different countries (Serbia, Bulgaria, and Romania). To achieve this purpose, we used PLS-SEM analysis and PLS-MGA. The results have shown that some drastic differences between these countries don't exist. All models confirmed both hypotheses, with or without statistical significance. These results were expected. Although Bulgaria and Romania are members of the European Union, similar political, cultural, and socio-economic backgrounds as in Serbia, contribute to the fact that certain factors have a similar influence.

This study is very significant because it contributes to the current entrepreneurship literature in Bulgaria, Romania and Serbia. It helps decision-makers in the high education sector to understand what factors are affecting student willingness to become entrepreneurs in order to improve entrepreneurship classes and encourage more students to think in that direction.

ACKNOWLEDGEMENT

The research presented in this paper was done with the financial support of the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, within the funding of the scientific research work at the University of Belgrade, Technical Faculty in Bor. according to the contract with registration number 451-03-47/2023-01/ 200131.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50, 179–211.

Chin, W.W., & Dibbern, J. (2010). A permutation based procedure for multi-group PLS analysis: results of tests of differences on simulated data and a cross cultural analysis of the sourcing of information system services between Germany and the USA, in: V.E. Vinzi (Ed.), Handbook of Partial Least Squares: Concepts, Methods and Applications, Springer, Heidelberg, 171–193.

Crane, F.G. (2014). Measuring and enhancing dispositional optimism and entrepreneurial intent in the entrepreneurial classroom: An Bahamian study. Journal of the Academy of Business Education, 15, 94-105.

Davis, P.E., & Peake, W.O. (2014). The influence of political skill and emotional intelligence on student entrepreneurial intentions: An empirical analysis. Small Business Institute Journal, 10(2), 19-34.

Dimitrova, M., Yoveva, I., & Kamenova, D. (2012). University students' attitudes and intentions towards entrepreneurial education, IUC Annual Book, 5.

Đorđević, D., & Bogetić, S. (2010). Development of entrepreneurial behavior of young people in the Republic of Serbia. Megatrend Review, 7 (2), 63-78.

Djordjevic, D., Cockalo, D., Bogetic, S., & Bakator, M. (2021). Predicting Entrepreneurial Intentions among the Youth in Serbia with a Classification Decision Tree Model with the QUEST Algorithm. Mathematics, 9(13), 1487.

Dodescu, A.O., Botezat, E.A., Pop Cohut, I.C., & Borma, A. (2019). Antecedents, Experiences and Entrepreneurial Intentions among Economics Students. In C. Ignatescu (ed.), 12th LUMEN International Scientific Conference Rethinking Social Action. Core Values in Practice, 15-17 May 2019, Iasi – Romania, 89-107.

Dragin, A.S., Mijatov, M.B., Munitlak Ivanović, O., Jovičić Vuković, A., Ivkov Džigurski, A., Košić, K., Nedeljković Knežević, M., Tomić, S., Stankov, U., Vujičić, M.D., Stojanović, V., Ivanović Bibić, Lj., Đerčan, B., & Stoljković, A. (2022). Entrepreneurial Intention of Students (Managers in Training): Personal and Family Characteristics. Sustainability, 14, 7345.

FakhrEldin, H. (2017). The relationship between the emotional intelligence of entrepreneurs and the new venture creation: The role of age, gender and motive. Arab Economic and Business Journal, 12(2), 99-108.

Fanea-Ivanovici, M. & Baber, H. (2021). Predicting Entrepreneurial and Crowdfunding Intentions – A Study of Romania and South Korea, Amfiteatru Economic, 23(15), 1003-1014.

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. Journal of Marketing Research, 18(3), 382-388.

Gelard, P., & Saleh, K.E. (2011). Impact of some contextual factors on entrepreneurial intention of university students. African Journal of Business Management, 5(26), 10707–10717.

Gibb Dyer, Jr W. (2006). Examining the family effect on firm performance. Family business review, 19(4), 253-273.

Hadjitchoneva, J. (2021). Student Entrepreneurship 2021: Insights From Bulgaria. Retrieved from GUESSS website: https://www.guesssurvey.org/.

Hair Jr., J.F., Hult, G.T.M., Ringle, C.M., & Sarstedt, M. (2017). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), 2 ed., Sage publications.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. International Marketing Review, 33(3), 405–431.

Hristova, V., & Wolejsza, P. (2020). The Empirical Study on Motivation for Starting a Business by Bulgarian and Polish Students, PROCEEDINGS OF 3rd International Conference Southeast Europe: History, Culture, Politics, and Economy, 140-149.

Hult, G.T.M., Ketchen, D.J., Griffith, D.A., Finnegan, C.A., Gonzalez-Padron, T., Harmancioglu, N., Huang, Y., Talay, M.B. & Cavusgil, S.T. (2008), Data equivalence in cross-cultural international business research: assessment and guidelines, Journal of International Business Studies, 39 (6), 1027-1044

Ingram, A., Peake, W.O., Stewart, W., & Watson, W. (2017). Emotional intelligence and venture performance. Journal of Small Business Management, 57(3), 780-800.

Javed, F., Ali, R., Hamid, A., Shahid, M., & Kulosoom, K. (2016). Role of social networks, emotional intelligence and psychosocial characteristics in developing entrepreneurial intentions of students. Sukkur IBA Journal of Management and Business, 3(1), 54-81.

Liñán, F., & Fayolle, A. (2015). A systematic literature review on entrepreneurial intentions: Citation, thematic analyses, and research agenda. International Entrepreneurship and Management Journal, 11(4), 907-933.

Madar, N. K., Teeni-Harari, T., Icekson, T., & Yaron Sela, I. (2019). Optimism and entrepreneurial intentions among students: The mediating role of emotional intelligence. Journal of Entrepreneurship Education, 22(4), 1-19.

Mayer, J.D., & Salovey, P. (1997). What is emotional intelligence? In Salovey, P., & Sluyter, D.J. (Eds.). Emotional development and emotional intelligence: Educational implications (3-31). New York: Harper Collins.

Misoska, A.T., Dimitrova, M., & Mrsik, J. (2016). Drivers of entrepreneurial intentions among business students in Macedonia. Economic Research-Ekonomska Istraživanja, 29(1), 1062-1074.

Mohar, Y., Singh, M.S., & Kamal, K.K. (2007). Relationship between psychological characteristics and entrepreneurial inclination: a case study of students at University Tun Abdul Razak (UNITAR). Journal of Asia Entrepreneurship and Sustainability, 1-10.

Mortan, R.A., Ripoll, P., Carvalho, C., & Bernal, M.C. (2014). Effects of emotional intelligence on entrepreneurial intention and self-efficacy. Journal of Work and Organizational Psychology, 30, 97-104.

Nabi, G., Walmsley, A., Liñán, F., Akhtar, I., & Neame, C. (2018). Does entrepreneurship education in the first year of higher education develop entrepreneurial intentions? The role of learning and inspiration. Studies in Higher Education, 43(3), 452-467.

Nielsen, S.L., & Lassen, A.H. (2012). Identity in entrepreneurship effectuation theory: a supplementary framework. International Entrepreneurship and Management Journal, 8, 373–389.

Nikolić, M., Ćoćkalo, D., Terek, E., Božić, S., & Nastasić, A. (2017). The impact of life values on entrepreneurial intentions of students in Serbia. Journal of Engineering Management and Competitiveness (JEMC), 7(1), 28-34.

Nitu-Antonie, R.D., Feder, E.S., Nitu-Antonie, V., & György, R.K. (2023). Predicting Sustainable Entrepreneurial Intentions among Romanian Students: A Mediated and Moderated Application of the Entrepreneurial Event Model. Sustainability, 15, 5204.

O'Boyle, E.H.Jr., Humphrey, R.H., Pollack, J.M., Hawver, T.H., & Story, P.A. (2011). The relation between emotional intelligence and job performance: A meta-analysis. Journal of Organizational Behavior, 32(5), 788-818.

Ognjenović, K. (2022) Entrepreneurial Intentions of Students in Serbia: Evidence from Different Fields of Study. In: Human Capital and Welfare. University of Antwerp, Antwerp, Belgium, 72-90.

Ozgen, E., & Minsky, B. (2013). Why some college students engage in entrepreneurial activities while others do not. Journal of Entrepreneurship Education 16, 45–58.

Pejic Bach, M., Aleksic, A., & Merkac Skok, M. (2018). Examining determinants of entrepreneurial intentions in Slovenia: Applying the theory of planned behaviour and an innovative cognitive style. Economic Research-Ekonomska Istrazivanja, 31(1), 1453–1471.

Popescu, C.C., Maxim, A., & Maxim, L. (2014). Determinants of entrepreneurial intentions among Romanian students, Transformations in Business and Economics 13(3), 370-388.

Rajković, J., Poštin, J., Konjikušić, M., Jagodić Rusić, A., Stojković, S., & Nikolić, M. (2020). The enterprise potential, individual entrepreneurial orientation and entrepreneurial intentions of students in Serbia, The European Journal of Applied Economics, 18 (1), 106 – 125.

Ringle, C. M., Wende, S., & Becker, J.M. (2022). SmartPLS 4. Oststeinbek: SmartPLS GmbH, http://www.smartpls.com.

Rokhman, W., & Ahamed, F. (2015). The role of social and psychological factors on entrepreneurial intention among Islamic college students in Indonesia. Entrepreneurial Business and Economics Review, 3(1), 29–42.

Rusu, V.D., Roman, A., & Tudose, M.B. (2022). Determinants of Entrepreneurial Intentions of Youth: the Role of Access to Finance, Engineering Economics, 33(1), 86–102.

Sarstedt, M., Henseler, J., & Ringle C. M. (2011). Multigroup analysis in Partial Least Squares (PLS) path modeling: alternative methods and empirical results, in: S. Marko, S. Manfred, R.T. Charles (Eds.), Measurement and Research Methods in International Marketing, Emerald Group Publishing Limited, 195–218.

Schlaegel, C., & Koenig, M. (2014). Determinants of entrepreneurial intent: a meta-analytic test and integration of competing models. Entrepreneurship Theory and Practice, 38(2), 291-332.

Shirokova, G., Osiyevskyy, O., & Bogatyreva, K. (2016). Exploring the intention–behavior link in student entrepreneurship: Moderating effects of individual and environmental characteristics. European Management Journal, 34(4), 386-399.

Siu,W.S., & Siu–chung Lo, E. (2013). Cultural contingency in the cognitive model of entrepreneurial intention. Entrepreneurship Theory and Practice, 37(2), 147–173.

Sperber, S., & Linder, C. (2018). Gender-specifics in start-up strategies and the role of the entrepreneurial ecosystem. Small Business Economics 53, 533-546.

Stamboulis, Y., & Barlas, A. (2014). Entrepreneurship education impact on student attitudes. The International Journal of Management Education, 12, 365-373.

Tiwari, P., Bhat, A.K., & Tikoria, J. (2017). The role of emotional intelligence and self-efficacy on social entrepreneurial attitudes and social entrepreneurial intentions. Journal of Social Entrepreneurship, 8(2), 165-185.

Trif, S.M., Noja, G.G., Cristea, M., Enache, C., & Didraga, O. (2022). Modelers of students' entrepreneurial intention during the COVID-19 pandemic and post-pandemic times: The role of entrepreneurial university environment. Frontiers in Psychology, 13,976675.

Turulja, L., Veselinovic, Lj, Agic, E., & Pasic-Mesihovic, A. (2020). Entrepreneurial intention of students in Bosnia and Herzegovina: what type of support matters? Economic Research-Ekonomska Istraživanja, 33 (1), 2713-2732.

Van Gelderen, M., Kautonen, T., & Fink, M. (2015). From entrepreneurial intentions to actions: Self-control and action-related doubt, fear, and aversion. Journal of Business Venturing, 30(5), 655-673.

Wold, H.O.A. (1982). Soft Modeling: The Basic Design and Some Extensions. In: Joreskog, K.G. and Wold, H.O.A., Eds., Systems under Indirect Observations: Part II, North-Holland, Amsterdam, 1-54.

Yordanova, D., Filipe, J.A., & Pacheco Coelho, M. (2020). Technopreneurial Intentions among Bulgarian STEM Students: The Role of University. Sustainability, 12, 6455.

Zampetakis, L.A., Kafetsios, K., Bouranta, N., Dewett, T., & Moustakis, V.S. (2009a). On the relationship between emotional intelligence and entrepreneurial attitudes and intentions. International Journal of Entrepreneurial Behavior Research, 15(6), 595-618.

Zhou, H., & Bojica, A.M. (2017). The role of emotional intelligence in entrepreneurs' perceptions of success: An exploratory study. International Review of Entrepreneurship, 15(3), 341-360.

Volume XIX, Issue (1) (2023) 1-11

International May Conference on Strategic Management

THE IMPACT OF THE STATE OF THE OIL AND GAS SECTOR OF AZERBAIJAN ON ECONOMIC GROWTH

Hajiyeva Gulnara[1*], Hasanova Afag[2], Balajayeva Tahmina[2], Fuad Shamseddin Baghirov[1]

[1]Western Caspian University, Azerbaijan; [2]Baku State University, Azerbaijan

Abstract: The oil industry, which includes such important industries as exploration, production, transportation, refining and marketing, has determined the fate of mankind and the world since the 19th century. This shows that we must take into account the great attention to the exploration and production of oil and the possibility of gas in our country. It is noted that SOCAR has become an exporter of oil in the country: today it accounts for about 70% of Azerbaijan's crude oil exports. The expansion of activities to identify and establish such indicators of productivity in economic relations is due to the high assessments of SOCAR's development. Methods used in Azerbaijan of a close relationship between oil exports and GDP. With the successful implementation of the National Oil Strategy, the joint use and export of hydrocarbon resources with foreign companies is increasing every year due to the rapid increase in foreign exchange earnings in our country. Azerbaijan is a world leader in economic growth, an initiator and participant in important regional and international projects. As a result of integration into the global economic system, the best practices in the field of oil revenue management have been introduced.

Keywords: Azerbaijan, Oil, Natural Gas, economic growth

1. INTRODUCTION

Modern life depends on energy, and today the most important part of the world's energy needs is met by hydrocarbons, primarily oil and natural gas, and then coal. Today, the oil and gas industry, or the oil industry for short, is the largest industry in the energy sector and provides a critical service to humanity. The history, money, and politics of the oil industry, as well as its future, are detailed in the study of Economides & Oligny (2004). In recent years, "high" prices for oil and natural resources and pressure on the environment, on the one hand, are pushing humanity and nations to search for cheaper and more environmentally friendly alternative energy sources, on the other hand, directing the oil industry to increase investment and production. The oil and gas industry is experiencing its golden age and it is certain that it will leave its mark on important energy developments in the coming years.

[*] *Corresponding author: hajievagulnara@gmail.com*

2. CLEAN ENERGY AND GLOBAL INVESTMENT IN ENERGY EFFICIENCY: TRENDS

Despite the positive developments and efforts in the field of gas, more investment and efforts are required in the exploration and production of oil and natural gas, which is reflected in the road map of the Republic of Azerbaijan. Here the primary task falls on industry and the state. If great importance is given to R&D and technology development in the field of oil production, exploration and mining within the industry-university-state triangle, new oil and natural resources will be created by analyzing the complex geological structure of Azerbaijan, as in developed countries. Exploration of gas reservoirs and finding solutions to the problems of increasing production from our mature reservoirs will not be difficult. In 2022, annual global energy investment is expected to grow to $1.9 trillion, about 10% more than in 2020, and total investment will return to pre-crisis levels.

Despite significant differences between countries, investment prospects have improved significantly with economic growth. According to the latest IEA forecasts, global energy demand is expected to grow by 4.6% in 2022, more than offsetting a 4% decline in 2021.

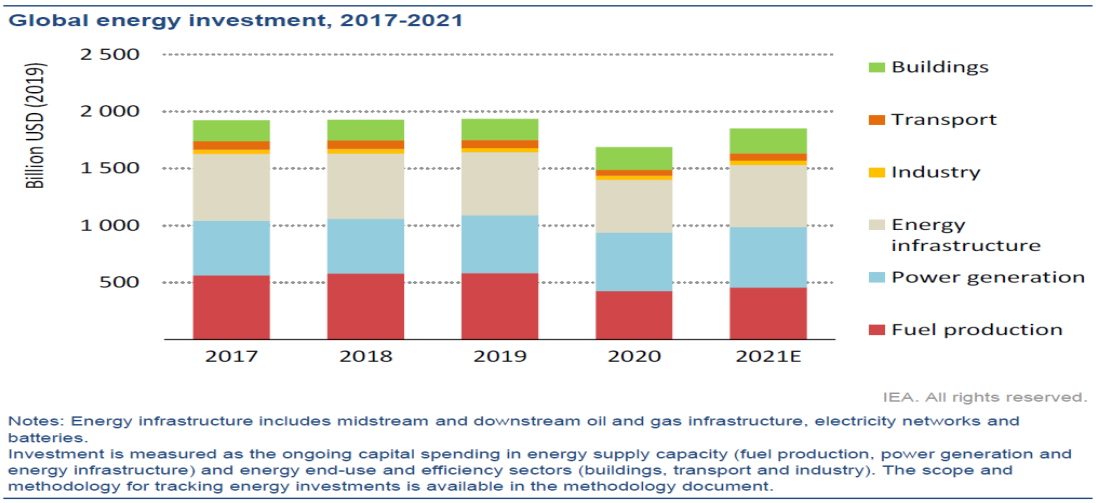


Figure 1. Global Energy Investments (IEA ,2022)

Due to the high cost of renewable energy, electricity still accounts for the largest share of total investment in energy supply. After solid growth in 2020, global investment in the energy sector is expected to increase by about 5% to exceed USD 820 billion in 2021. Renewables are the leading investment in new power generation and are expected to account for 70% of the total US$530 billion spent on all new generation capacity in 2021. The rest is invested in networks and storage. With rapidly improving technology and lower costs, for every dollar spent today on investment in wind and solar photovoltaic (PV) energy, it is possible to quadruple the power generation capacity of a dollar spent on the same technologies ten years ago.

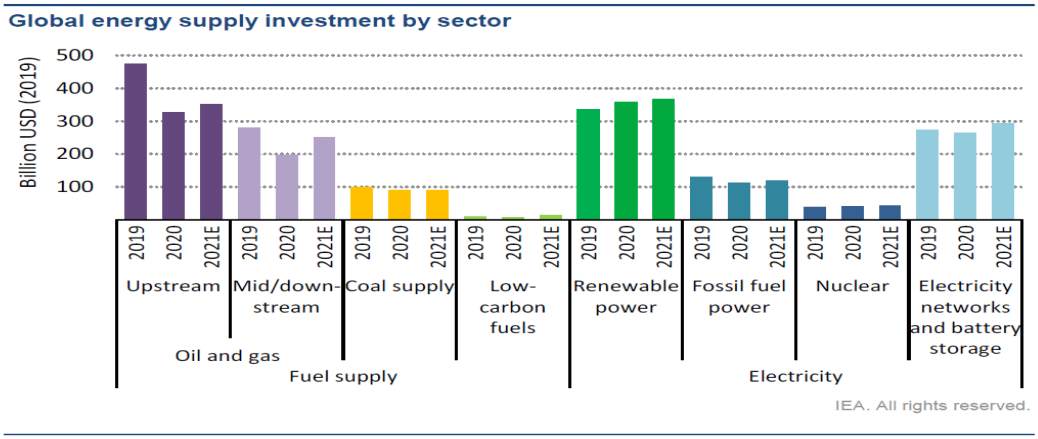


Figure 2. Global investment in energy supply by sector (IEA ,2022)

Much of the spending flexibility in 2020 is concentrated in a few markets, especially the US and Europe, as well as the People's Republic of China, which has had a great year for wind energy investment. Capital expenditures in the power sector exceed oil and gas deliveries for the fifth year in a row in 2020. Electrification has also been a major driver of end-user investment spending.

Electric vehicle sales continue to rise as automakers offer more new models, bolstered by fuel-saving goals and zero-emissions car imperatives. Politics remains a key driver for many energy investments as recovery plans become apparent in some countries. In countries where governments have more fiscal space and can borrow at lower rates, recovery strategies offer an excellent opportunity to increase investment in infrastructure, efficiency and clean energy technologies. In infrastructure, electricity grid spending, led by China and Europe, is expected to increase in 2021 after declining for the fourth consecutive year in 2020. Proposed infrastructure spending in the United States, if approved, will help to boost that momentum. Many developing countries lack the tools to implement comprehensive recovery strategies, and early signs of inflation in some countries cast doubt on how long the current low interest rate environment will last. The momentum from net zero commitment and sustainable funding has not yet resulted in a significant increase in actual spending on clean energy projects. Last year, governments, companies and financial institutions committed to achieving zero emissions by 2050 or later.

The financial community in many advanced economies has rallied around sustainable finance, launching funds and initiatives to channel the growing appetite from capital markets and comply with new disclosure rules. The expected USD 750 billion to be spent on clean energy technologies and efficiency improvements worldwide in 2021 is far less than required in climate-driven scenarios. As highlighted in the new IEA roadmap for Net Zero by 2050, the policy should lead to a historic increase in investment in clean energy this decade.

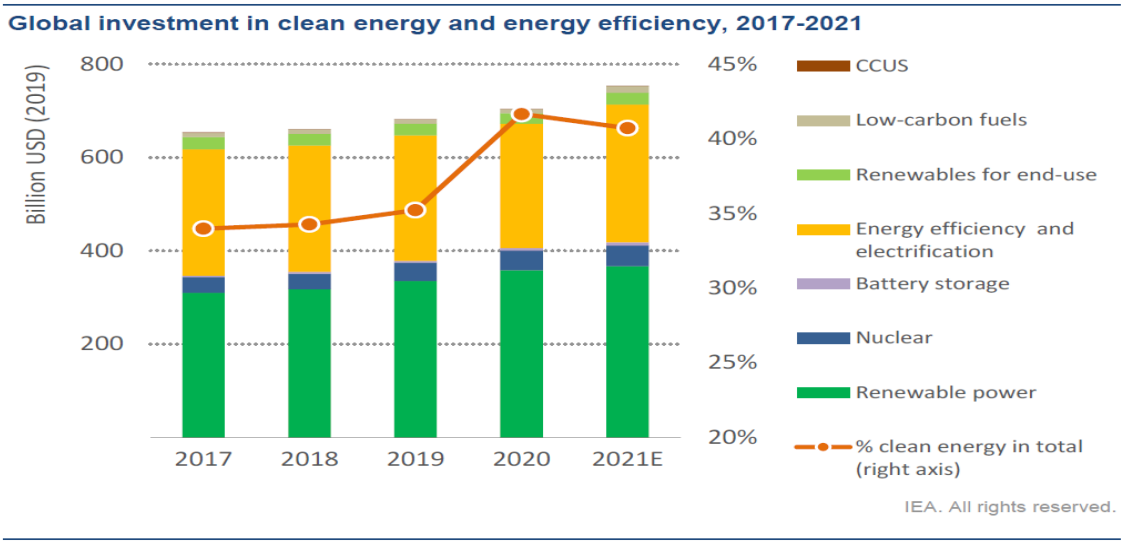


Figure 3. Clean energy and global investment in energy efficiency, 2017-2021 (IEA ,2022)

As companies recover financially from the shock of 2020, investment in oil and gas exploration and production is expected to increase by about 10% in 2021, although spending will be well below pre-crisis levels. Higher demand and higher oil and gas prices have led to a change in investment strategies. Cost control remains a common theme, but some major national oil companies are looking to invest in cycles to gain market share. Qatar's decision to continue the world's largest expansion of liquefied natural gas (LNG) production and to include carbon capture in its development plans is a strong statement of its intention to maintain its leading position in the LNG field. Private companies are under intense pressure to keep their oil and gas portfolios under control. Despite higher prices, major oil companies are keeping their total oil and gas spending stable in 2021, and their share of total exploration and production spending is now 25%, compared to about 40% in the mid-2010s. The shale gas industry is now sticking to its new commitment to capital discipline to pay down debt and return cash to shareholders instead of boosting production. Investment in clean energy technologies by the oil and gas industry is starting to increase. Oil and gas companies are under increasing pressure to adapt their investment strategies to the needs of the clean energy transition. This comes in many forms, including commitments to reduce emissions from oil and gas supplies or invest in new areas such as clean electricity or clean fuels.

3. REVIEW OF SCIENTIFIC SOURCES ON THE PROBLEMS OF REGIONAL MANAGEMENT OF ECONOMIC GROWTH AND OIL EXPORTS

Literature exploring the relationship between economic growth and oil exports. The study notes that oil is becoming the most visible indicator of economic growth. Oil prices also make their main contribution to the impact on GDP, including various fictitious shocks in the data. In this study, the Cobb-Douglas production function was used to build a model by introducing the total oil consumption and oil price variable in Pakistan to study the impact on GDP. Integration and Granger causality tests with constraints on the dynamic model are used to test the order of integration, long-term and short-term dynamics, and causality between variables using yearly data. When studying the results, it is noted that oil prices negatively affect real GDP in the long term, but positively in the short term (Nazir & Hameed, 2015). It is researched that oil price spikes occur during periods of fluctuations in the global business cycle and/or financial shocks affect the relationship between oil and economic growth in OPEC countries.

The purpose of this study is to examine the degree of correlation between oil prices and growth in economic activity for four major countries (United Arab Emirates, Kuwait, Saudi Arabia and Venezuela). The frequency approach of Priestley & Tong (2009) is proposed, which is an evolutionary cospectral analysis. This method offers a time-varying dynamic correlation measure for different horizons, short and medium term (Ftiti et al., 2016).

The study of Bogeman & Macsen (2015) considers how oil price fluctuations affect economic growth in net oil exporting countries. The purpose of the study is to conclude whether economic growth in the Organization of the Petroleum Exporting Countries (OPEC) is more sensitive to oil price shocks than economic growth in other exporting countries. Ugur, & Khalid (2015) examined the impact of oil price shocks on economic growth. The model variables are GDP, oil price, government spending, foreign direct investment, inflation, exports and imports. The study uses augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests to establish the stationarity of panel data models.

The empirical results of the study showed a positive and significant impact of oil price shocks on economic growth (GDP) of the selected six OPEC countries. Natural gas is an important energy resource that is used to produce national products. On the other hand, since natural gas is a relatively cleaner energy resource than oil and coal, it is believed that increasing the use of natural gas will improve environmental quality (Sohail et al., 2022).

Turedi & Turedi (2021) studied the impact of renewable and non-renewable energy sources and economic growth on CO^2 emissions in 53 developing countries. For this purpose, the study uses a two-stage difference generalized method of moments (GMM) approach. Empirical results show that there is an inverted U-shaped relationship between economic growth and CO^2 emissions, which supports the Environmental Kuznets Curve (EKC) hypothesis. The impact of renewable energy consumption (REC) on CO^2 emissions was negative and significant, while the impact of non-renewable energy consumption (NREC) was positive and significant.

In their study, Hanif et al. (2019) examined the long- and short-term effects of fossil fuel consumption, foreign direct investment, and economic growth on carbon emissions in fifteen developing countries in Asia. Empirical data allow analysis of panel data and apply an autoregressive distributional lag (ARDL) model.

Research by Ashraf & Rahman (2020) identifies the impact of foreign direct investment, urbanization, economic growth and fossil fuel consumption on carbon emissions in eleven developing countries in Asia. The survey results confirm the existence of (EKC) in these eleven emerging Asian economies. Gunarto (2020) analyzed the relationship between carbon emissions, economic development, energy consumption and FDI in Asian countries, including applying autoregressive tests of the distribution of lag boundaries for cointegration. According to the results, there is a direct relationship between energy consumption and carbon dioxide emissions.

The relationship between renewable energy consumption (REC), foreign direct investment (FDI) inflows, economic growth and their impact on CO^2 emissions is widely discussed in a study by Naz et al. (2019). The results show that economic growth and FDI inflows increase CO2 emissions, while REC substantially reduces CO^2 emissions over the time period studied. The results do not support the inverted U-shaped Environmental Kuznets Curve (EKC) hypothesis for per capita income (and FDI inflows) and per capita CO^2 emissions in the country. The results confirmed the "pollution hypothesis" that FDI inflows damage the country's natural flora. In their study, Laureti et al. (2022) studied the role of "renewable energy consumption" in the context of the circular economy.

Gasimov & Hajiyev (2021) in their study assessed the history and current state of the oil industry in our country from the moment the State Oil Company of the Republic of Azerbaijan (SOCAR) was established to the present day.

It is noted that SOCAR also strengthened its positions in the international financial market and took advantage of new banking products. Thus, over the years of independence, new oil and gas fields have been discovered, modern technologies have been mastered, new agreements have been concluded with international oil companies, international financial reporting and risk management in the oil and gas industry have been assessed. It is emphasized that oil and gas enterprises with international financial statements have a favorable investment climate that allows them to effectively manage competitive production.

4. RESEARCH RESULTS

4.1. The state of oil and natural gas in the world

The world requires energy, and in 2004 the world consumed 415 quadrillion BTU (BTU - British thermal units). This amount is approximately 210 million barrels per year in terms of crude oil. Of this, 39% is crude oil, 23.5% natural gas, 23.5% coal, 8% renewable energy and 6% nuclear (IEA, 2022; BP, 2012). The transport of goods and people from one place to another is essential to the well-being of modern life. As automotive fuels, oil and natural gas, especially crude oil products (gasoline, diesel, LPG, etc.), have many advantages over other fuels due to their high volumetric energy density and ease of transportation. For this reason, today there is practically no alternative as an automotive fuel. The mass and volume energy densities of hydrogen (fuel cells) and various petroleum/natural gas-based automotive fuels that are expected to replace oil and natural gas as automotive fuels in the near future, although the energy density of hydrogen by mass is quite high (approx. 3 times) (for this reason, it is a fuel commonly used in space rockets), its energy density by volume is quite large (about 4 times) less than fuel oil/natural gas for automotive fuel. Thus, these physical facts raise a very important storage problem for hydrogen. Although it is a cleaner fuel than oil and natural gas, hydrogen is not a direct source of energy (it is an energy carrier, like electricity, it is the most economical). Currently, hydrogen is not seen as an alternative to oil and natural gas because it requires very large storage volumes (Zeeshan et al., 2017). As shown in Figure 2, oil and natural gas do not play an important role in electricity generation. In addition to oil and natural gas, there are many alternatives for use in power generation. However, in recent years, natural gas has been used to generate electricity in the world due to attractive natural gas prices and less environmental impact. The use of this species is expected to increase slightly in the coming years (IEA, 2022). With the development of environmental consciousness, the carbon ratio in the world tends towards less fuel. Figure 3 shows carbon dioxide emission levels for various energy fuels. When we consider its economic efficiency and energy efficiency, the use of natural gas in the world is increasing at a significant rate. The rise in oil and natural gas prices over the past three years raises the question of whether oil and natural gas are being depleted and is a major controversy. According to the BP (BP, 2012) report, at the end of 2004, the world's proven reserves of crude oil amounted to 1.1886 trillion barrels (161.9 billion tons), natural gas - 179.53 trillion m3. Crude oil and natural gas production in 2004 was 80.3 million barrels per day and 7.4 billion MW per day, respectively. The most recent figure for proved oil reserves is from January 2006, and that month's proven oil reserves are 1.2925 trillion barrels (IEA ,2022). In a BP report (BP ,2012), consumption figures for 2004 are 80.8 mb/d for crude oil and 7.4 bcm/d for natural gas. As you can see, the amount consumed and produced are the

same, and this is the expected behavior. To date, the world has produced approximately 870 billion barrels and 65 trillion m3 of natural gas (Economides & Oligni, 2004).

4.2. The current state of the oil industry in Azerbaijan

The "contract of the century" played the role of the engine of the Azerbaijani economy and gave it a new breath. The increase in oil production required the construction of a major export pipeline in a short time (Rzayev, et al., 2020; Gasimov & Hajiyev, 2022; Humbatova et al., 2023). Azerbaijan's position and reputation as a world-class oil and gas country is largely due to the new renaissance in the oil and gas sector. At present, the deep-water part of the Chirag, Azeri and Gunashli fields produces an average of 2.7 million tons of oil and 1.5 billion cubic meters of associated gas per month. Another important fact is that Azerbaijan's crude oil exports have increased more than 10 times since the end of the 1990s, and SOCAR has become the country's largest oil exporter: today it accounts for about 70 percent of Azerbaijan's crude oil exports. (www stat.gov.az) During the development of the “Contract of the Century”, the hydrocarbon reserves of the ACG base block were doubled. On the eve of the agreement, total reserves are estimated at 511 million tons of oil and 160 billion cubic meters of gas. From the beginning of development to the present, 345 million tons of oil and 100 billion cubic meters of gas have been produced. It is expected that oil production in the coming period will be 34-35 million tons per year (BP ,2012). SOCAR owns a 66% stake in DESFA, the operator of the Greek gas transmission system. DESFA currently supplies natural gas to all regions through the transportation and storage of natural gas in Greece, as well as the construction, maintenance and operation of the country's gas transmission system. As part of the TAP project, the company plans to build the Greece-Italy and Greece-Turkey pipelines, which will create favorable conditions for the transportation of natural gas to other European countries. Thanks to the success of the Contract of the Century and other large-scale projects, Azerbaijan has turned from an already invested country into a promising country for foreign investment. Expansion of activity in foreign markets and thus establishment of productive economic ties is one of the strategic directions of SOCAR's development. Representations have been opened in 13 countries, a Swiss trading company has been established, presence in Georgia, Turkey, Ukraine, Romania, Switzerland and Greece, in a word, SOCAR has entered the world energy market (BP ,2012). Today SOCAR provides 90% of gas supplies to Georgia. Dozens of neighboring gas networks are managed by SOCAR Energy Georgia. Thanks to intensive work, about 4,600 km of gas pipelines were laid, gasification was reduced to 65% in a short time, and about 16,000 subscribers were gasified. Today, SOCAR controls about 25% of the Georgian oil products retail market. (www.neftegaz.ru).

In addition, 114 gas stations operate under the SOCAR brand in Georgia. SOCAR Trading S.A., established by us in Switzerland, aims to supply oil products directly and on favorable terms to consumers in order to optimize their income and centralize their activities. The company quickly established itself in Europe and strengthened the markets of Eastern and South-West Europe, North and West Africa, South-East Asia and the Mediterranean through offices and representative offices in Geneva, Singapore, Turkey, UAE, Nigeria and Vietnam. The trading company sells oil and oil products of SOCAR and other companies on international markets and provides intermediary services in commercial relations with third parties (IEA, 2022). Filling stations in Switzerland, Romania and Ukraine operate in line with the company's global strategic trends and provide a high level of customer service under the SOCAR brand. In several Swiss cities, including the airports of Zurich and Geneva, 148 stations, 30 stations in Romania and 41 stations in Ukraine operate (www.azerenerji.com) In addition to economic

benefits, oil and gas companies that have won the sympathy of buyers in the retail oil market make a significant contribution to the promotion of SOCAR and Azerbaijan as a whole.

Table 1. Dynamics of oil production in the Republic of Azerbaijan for 2012-2021 (thousand tons) (www stat.gov.az)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	43.4	43.5	42.0	41.6	41.0	38.7	38.8	37.5	34.5	34.6
Including: SOCAR	8.3	8.3	8.3	8.2	7.5	7.4	7.5	7.7	7.4	7.9
Together with foreign companies	35.1	35.2	33.7	33.4	33.5	31.3	31.3	29.8	27.1	26.7

Table 2. Dynamics of gas production in the Republic of Azerbaijan for 2012-2021 (billion m3)(www stat.gov.az)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	26.9	29.5	29.5	29.0	29.4	28.6	30.5	35.6	37.1	43.9
Including: SOCAR	6.9	7.2	7.2	6.9	6.3	6.1	6.6	6.8	7.3	7.9
Together with foreign companies	20.0	22.3	22.4	22.1	23.1	22.5	23.9	28.8	29.8	36.6

As can be seen from the table, the increase in oil and gas production in the country in 2012-2021. was accompanied by strengthening positions of the oil and gas sector in GDP. The table also shows that the oil and gas sector has a high share of all industries in the country. In other words, the potential of the oil and gas sector is equal to more than 90% of the country's industrial complex. Therefore, special attention should be paid to increasing the share of the industrial complex in the development of the non-oil sector and ensure the diversification of industrial policy. Oil and gas resources are one of the key factors in the economy of Azerbaijan, its cultural development and the improvement of the socio-cultural well-being of the population. In recent years, the increase in oil and gas reserves, their efficient use, the signing of new agreements by the state with other countries in this area have contributed to the development of the country's economy and, at the same time, to the improvement of the well-being of the population. The industry based on oil and natural gas resources, which makes up the most complete part of the country's natural resources, continues to be the leading branch of our economy. Combining 2/3 of the fuel and energy complex, the oil and gas industry also contributes to the revival of the economy as a key area of the country's socio-economic development. Today, the State Oil Fund has earned more than $25 billion from the sale of oil and gas, including the Contract of the Century» (www.oilfund.az). As a result of successful work with foreign partners, large volumes of oil revenues began to flow into our country. Large oil revenues open wide opportunities for the development of Azerbaijan. Thus, Azerbaijan has chosen as a strategic goal to compensate for the decline in oil revenues from the sale of natural gas, petrochemicals and oil products. New nano-technological equipment is used in the mining industry to maintain the stability of oil and gas production. The potential of old territories is overestimated by modern technologies and technologies. As of 2017, Azerbaijan's proven gas

reserves are estimated at 2.55 trillion cubic meters, and the country's proven oil reserves are estimated at 2 billion tons (www.stat.gov.az).

Of particular importance for TRACECA are also promising directions for the export of Azerbaijan's oil and oil products, the North-South International Transport Corridor and the Baku-Tbilisi-Kars railway line. These projects will turn Azerbaijan into a global transport and logistics center, and both oil and gas will diversify foreign trade in non-oil sectors.

Table 3. The dynamics of oil and GDP export in the Azerbaijan Republic for 2012-2021(www stat.gov.az)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Oil exports per capita, in US dollars	2410.3	2375.9	2129.0	1166.2	819.7	1413.6	1805.9	1783.3	1190.1	1940.0
GDP per capita, US dollars	7594.3	7977.4	7990.8	5561.5	3928.6	4198.5	4797.8	4864.0	4280.8	5452.5
The share of oil exports in total exports in the country,%	93.1	92.7	92.4	87.8	87	90.5	91.9	90.6	87.2	88.4

Using the regression equation, we find the parameters α_0 , α_1

$$\bar{y}_x = 1488.07 + 2.45x \quad (1)$$

Thus, the growth of oil exports per capita in thousands of US dollars every year will allow an average increase in GDP per capita by 2.45 thousand US dollars. In our example, the coefficient of elasticity will be equal to:

$$Ɛ = \alpha_1 * \bar{x} / \bar{y} = 2.45 * 1703.4/5664.62 = 0.7367 \quad (2)$$

This means that with an increase in export by 1%, the level of GDP will increase by 0.74%. Thus, there is a close relationship between these indicators. As can be seen from the table, the share of exports of oil and petroleum products, the maximum level was 93.1%, however, in 2020, despite a decrease in the share by 5.9%, in 2021, increasing by 1.2%, it accounted for 88.4% of the country's total exports.

5. CONCLUSION

Azerbaijan is a world leader in economic growth, an initiator and participant in important regional and international projects. With the successful implementation of the National Oil Strategy, the joint use and export of hydrocarbon resources with foreign companies is increasing every year due to the rapid increase in foreign exchange earnings in our country. As a result of integration into the global economic system, the best practices in the field of oil revenue management have been introduced. At the same time, thanks to the growing financial

capabilities of the country, strategic international infrastructure projects are being successfully implemented, which will contribute to the modernization of the transport infrastructure not only in Azerbaijan, but also in the region as a whole. Oil and gas resources appear as one of the main factors in the economy, cultural development, and improvement of social and cultural welfare of the population of Azerbaijan. In recent years, the increase of oil and gas reserves, their efficient use, the signing of new agreements by the state with other countries in this field served the development of the economy and at the same time improving the welfare of the country's population. The oil and gas industry, which unites 2/3 of the fuel-energy complex, is also part of our republic stimulates economic revival as the main area of socio-economic development.

REFERENCES

Ashraf, M.W., & Rehman, H. U. (2020). The Impact of Economic Growth, Foreign Direct Investment, Urbanization, Fossils Fuel Consumption on Environmental Degradation in Emerging Asian Economies. Journal of Business and Social Review in Emerging Economies, 6(4), 1479-1495.

Boheman, H., & Maxén, J. (2015). Oil Price Shocks Effect on Economic Growth. Lund Univesity.

BP (2012). BP Statistical Review of World Energy-2011, p. 9.

Economides M., & Oligni R. (2004). Oil color. The world's largest business: history, money and politics Moscow: Olimp-Business.

Ftiti, Z., Guesmi, K., Teulon, F., & Chouachi, S. (2016). Relationship Between Crude Oil Prices And Economic Growth In Selected OPEC Countries. The Journal of Applied Business Research, 32(1), 11-22.

Gasimov, A. A., & Hajiyev, G. B. (2021). On management evaluation of oil-gas industry enteprises in modern economic condition. SOCAR Proceedings, 3, 100-105.

Gasimov, A. A., & Hajiyev, G. B. (2022). Formation of the investment climate in the oil and gas industry of Azerbaijan and its impact on the development of the non-oil sector. SOCAR Proceedings Special Issue, 2, 033-042.

Gunarto, T. (2020). Effect of Economic Growth and Foreign Direct Investment on Carbon emission in the Asian States. International Journal of Energy Economics and Policy, 10(5), 563-569.

Hanif, I., Raza, S. M. F., Gago-de-Santos, P., & Abbas, Q. (2019). Fossil fuels, foreign direct investment, and economic growth have triggered CO2 emissions in emerging Asian economies: Some empirical evidence. Energy, 171(C), 493- 501.

Humbatova, S. I., Hajiyev, G. B., Aliyeva, L. Z., & Hajiyev, N. G.-O. (2023). Impact of Oil Exports on Imports of Agricultural Machinery and Equipment. International Journal of Energy Economics and Policythis, 13(1), 335-351.

IEA (2022). World Energy Investment – 2021.

Jahangir, S. M. R. (2017). Crude Oil, Natural Gas, Politics, and Economic Growth: Impact and Causality Analysis in Caspian Sea Region, Unpublished Master Dissertation, Anadolu University Social Sciences Institute, Eskişehir.

Laureti, L., Costantiello, A., & Leogrande, A. (2022). The Role of Renewable Energy Consumption in Promoting Sustainability and Circular Economy. A Data-Driven Analysis. Research Article (This is a preprint; it has not been peer reviewed by a journal). https://doi.org/10.21203/rs.3.rs-2412489/v1

Nazir, S., & Hameed, T. (2015). Impact of Oil Price and Shocks on Economic Growth of Pakistan: Multivariate Analysis (Sectoral Oil Consumption). Business and Economics Journal, 6(4), 1000182.

Naz, S., Sultan, R., Khalid Zaman, K., & Aldakhil, A. M. (2019). Moderating and mediating role of renewable energy consumption, FDI inflows, and economic growth on carbon dioxide emissions: evidence from robust least square estimator. Environmental Science and Pollution Research, 26, 2806-2819.

Priestley, M. B., & Tong, H. (2009). On the analysis of bivariate non-stationary processes (Book Chapter). University of Manchester, Institute of Science and Technology, United Kingdom, 257-270.

Rzayev, R., Aliyeva, S., Hajiyev, G., & Karimova, T. (2020). Assessment the attractiveness of countries for investment by expert knowledge compilation. Advances in Intelligent Systems and Computing, 1095 AISC, 331-339.

Sohail, H. M., Li, Z., Murshed, M., Alvarado, R., & Mahmud, H. (2022). An analysis of the asymmetric effects of natural gas consumption on economic growth in Pakistan: A non-linear autoregressive distributed lag approach. Environmental Science and Pollution Research, 29, 5687-5702.

Turedi, S., & Turedi, N. (2021). The effects of renewable and non-renewable energy consumption and economic growth on CO2 emissions: Empirical evidence from developing countries. Business and Economics Research Journal, 12(4), 751-765.

Uğur, A. A., & Khalid, K. R. (2015). The Impact of Oil Price Shocks on Economic Growth (A Case Study; Selected Six OPEC Countries) During The Period (1995-2014) Panel-Data Models. International Journal of Latest Research in Humanities and Social Science (IJLRHSS), 1(4), 17-27.

Zeeshan, K., Shah, K., Khurshid, A., Shahid, A., & Alina, K. (2017). Crude Oil Prices and Its Effect on Economic Growth; Analyzing Pre and Post Oil Prices Shocks: A Case Study of Pakistan Economy. Journal of Energy Technologies and Policy, 7(3), 10-15.

Volume XIX, Issue (1) (2023) 12-21

International May Conference on Strategic Management

THE IMPACT OF EDUCATION LEVEL ON SME's FINANCIAL PERFORMANCE: A SOUTH AFRICAN PERSPECTIVE

Vusumzi M. Msuthwana*

Nelson Mandela University, South Africa

Abstract: The purpose of this study was to analyse the impact of education level on SME's financial performance in the Nelson Mandela Metropolitan, South Africa. An analysis of existing finance literature indicates that demographic factors such as education level are possibly among the main determinants of SME owner-managers' financial literacy which may affect business financial performance. Thus, an analysis of the level of education of the owner-manager should give an indication of whether increasing education level results in the increase of financial performance of SMEs. Hence it was important to identify whether there is a correlation between education level of owner-managers and their financial literacy as well as the degree of correlation that may potentially exist between owner-managers' financial literacy and financial performance of their businesses. Findings of the study reveals that SMEs under management of owner-managers with higher levels of education may be better managed than those SMEs under the management of owner-managers holding lower levels of education. In addition, a mix of financial knowledge, financial skill and financial behaviour described in this research provide a systematic combination of financial literacy components that can be used by owner-managers of SMEs to improve their business financial performance.

***Keywords**:* Education level, financial knowledge, financial skill, financial literacy, financial performance

1. INTRODUCTION

The competitive nature of the current business environment places great emphasis on financial performance as a crucial objective for any small to medium-sized enterprises (SMEs) (Nanda & Panda, 2017). Financial performance is the extent to which predetermined financial objectives were achieved (Usama & Yusoff, 2019). Thus, when SMEs fail, emphasis is often placed on the financial knowledge of owner-managers and in turn the financial performance (Dahmen & Rodríguez, 2014). Usama and Yusoff (2019) argue that there may be a connection between the financial knowledge of owner-managers and the financial performance of SMEs.
A well-financially managed SME requires informed business decisions to be made by owner-managers based on the information available (Neneh & van Zyl, 2012). This requires owner-managers to be financially literate (Ribeiro-Soriano & Castrogiovanni, 2012), in order to understand and interpret financial conditions that affect their own businesses (Usama & Yusoff, 2019). Financial literacy of SME owner-managers is an important resource for financial decision making (Dahmen & Rodríguez, 2014), that does not only impact the day-to-day

* *Corresponding author: vusumzi.msuthwana@mandela.ac.za*

management of SMEs but the future financial performance of SMEs (Zait & Bertea, 2014). Hence, poor financial literacy could make owner-managers to be incapable of taking advantage of the various financing options available for the business (Eniola & Entebang, 2016), which may in turn stifle the long-term financial sustainability of these SMEs (Ngek, 2016). Therefore, without proper initiatives geared towards the provision of financial education, poor financial literacy levels will persist and may continue to hinder the financial performance of SMEs (Fiseha & Oyelana, 2017). The question guiding this study is: *How does the level of education of owner-managers of SMEs effect their level of financial literacy, and ultimately the financial performance of their businesses?*

2. LITERATURE REVIEW

Since this study is focusing on the education level of the owner-managers of SMEs linking it to financial literacy, and ultimately their business performance, the following sub-sections elaborate on these concepts.

2.1. Education Level

Knowledge is regarded as one of the basic constituents of financial literacy (Hilgert & Hogarth, 2003), which led to studies speculating about and investigating the role that education may play in financial literacy (Lusardi et al., 2009). According to Lotto (2020), these investigations has since confirmed education as one of the more important factors influencing individuals' financial literacy. Consequently, being educated has long since been thought of as a necessary requirement to be considered financially literate (Hogarth & Hilgert, 2002), and the belief was that educated individuals possess larger pools of knowledge from which to draw when making financial decisions (Falahati et al., 2011). This led to further studies about how educated individuals' financial decision making compared to those considered uneducated or less educated (Young et al., 2017:553). Ooko (2017), found that educated individuals were more likely to implement stricter budget controls and maintain records of their spending. These individuals did not only show a propensity to draft and implement personal budgets, improved rates of saving, and less reliance on debt, they were also more motivated to adhere to it, over the long term (Mansor et al., 2015; Zaleskiewicz & Traczyk, 2020).

On the contrary, uneducated individuals were found to exhibit financially risky behaviour and were more prone to excessive usage of debt and impulsive spending (Fornero & Monticone, 2011), and more prone to satisfy their current desires (Koning & Harbor, 2013). Consequently, the National Financial Educators Council (2020) further found that less than half of uneducated individuals observed, had learnt from their past experiences, thus, they were likely to continue with their risky behaviour and possibly resulting in them being stuck in an on-going cycle of poor financial decisions. Previous studies were however, not specifically focusing on the education level of owner-managers, rather on general education. It is for this reason that the following hypothesis is posed:

H^1: There is a significant relationship between *Education Level* and *Financial Literacy*.

2.2. Financial literacy and financial performance

Studies focusing on financial literacy have identified financial knowledge, (Falahati et al., 2011), financial skills (Amagir et al., 2018), and financial behaviour (Lusardi, 2019), as the three main components comprising financial literacy. The OECD (2013) highlighted these components as the primary indicators that are referenced when assessing individuals' financial

literacy levels. Financial knowledge and skill are linked (Guliman, 2015), and are the foundational requirement that individuals must possess to be considered financially literate (Falahati et al., 2011). They are typically gained through experience and formal educational interventions (Kaiser et al., 2020) and they guide individuals in making informed financial decisions. SME owner-managers utilise their financial knowledge and skills when managing their businesses, hence converting their knowledge and skills into sound financial behaviours (Rai et al., 2019).

Siekei et al. (2013) performed an investigation comparing the performance of Kenyan businesses, prior to and after, their owner-managers underwent financial literacy training, and found a link between education and financial literacy. Treptow (2014) as well as Campo and Barnes (2017), found that financially literate owner-managers have a propensity to utilise their businesses' financial resources and available financial information more astutely (i.e., their financial behaviour), thus enabling them to improve profitability. Mutiso and Muigai (2018) as well as Usama and Yusoff (2019) performed further investigation on the relationship between financial literacy and business performance, and their rationale was that financially literate owner-managers tend to possess transferable financial expertise and financial skills that could better equip them to manage their SMEs' finances. Therefore, there should be a relationship between financial literacy and financial performance of SMEs. Hence the following hypothesis was put forward:

H^2: There is a significant relationship between *Financial Literacy* and *SMEs' Financial Performance*.

3. RESEARCH METHODOLOGY

In this study, a quantitative approach was necessary to ensure that objectivity of the study is maintained and that its findings are not influenced by the personal biases of researchers (Collis & Hussey, 2014). Since the data has been collected through quantitative approach, a causal comparative research was used to investigate how education level and financial literacy influence financial performance. The aim of causal comparative research was to determine the cause-and-effect relationship that may exist between the variables of the study (Salkind, 2010). The primary data was acquired by means of an empirical investigation that was carried out amongst the owner-managers of SMEs using the following criteria, namely, owner-managers of:

- SMEs that have been in continuous operation for at least two years.
- SMEs that employ between five and thirty full-time employees.
- SMEs whos' owner-managers are actively involved in the daily running and managing of the business.
- SMEs that are located and operating within the Nelson Mandela Metropolitan, South Africa.

Due to the size of the population and limited resources, a representative sample was chosen from this population, where probability sampling was used with the assumption that the characteristics of the chosen sample will be similar to that of the target population from which it was drawn (Wisniowski et al., 2020). Furthermore, judgemental sampling approach was used as the respondents being selected depends on them meeting the inclusion criteria as previously stipulated. Hair et al., (2013) opined that studies investigating less than seven constructs, require a sample size of at least 300 respondents. However, considering the onset of the Covid-19 pandemic, the resultant lockdown restrictions during 2021 when the data was collected, and the

reluctance of owner-managers to participate in the study during this period, a smaller sample size had to be considered. Based on Hair et al. (2013), researchers would generally not conduct multivariate analysis using a sample of fewer than 50 observations, and preferably the sample size should be 100 or more, therefore the sample size of 103 usable questionnaires from SMEs operating in the Nelson Mandela Metropolitan was considered sufficient.

The data was analysed using the applications STATISTICA (version 14.0) and SPSS 23. The data analysis process commenced by determining the validity and reliability of the measuring instrument that was developed. This information was then subjected to inferential statistics techniques, to measures the extent to which increases in one variable would lead to an increase or decrease in another variable (Schober et al., 2018). The one-way analysis of variance (ANOVA) was performed to establish whether there are significant differences between the means of education level and financial literacy. Descriptive statistics in the form of means, variance and standard deviation were computed for the financial literacy and financial performance. The regression analysis was used to establish the relationship between financial literacy and the SMEs financial performance.

4. EMPIRICAL RESULTS

4.1. Level of Education

Education level is the independent variable (see Table 7). It was computed to show levels of education from pre-matric up to post-graduate level as shown in Table 1.

Table 1. Educational qualification distribution

Highest level of education	Frequency (N)	Percentage (%)
< Matric (Grade 12)	20	19.4
Matric (Grade 12)	31	30.1
Post Matric Certificate/Diploma	25	24.3
Bachelor's Degree	20	19.4
Post-graduate qualifications	7	6.8
Total	**103**	**100**

From Table 1, the highest percentage (30.10%) of the respondents indicated that their highest qualification attained was a matric certificate. This was followed by respondents who held a post matric certificate or diploma (24.30%). Respondents with an education less than a matric and those holding a bachelor's degree, both comprised 19.40% of the total respondents, respectively. It was only 6.80% of the total respondent with a postgraduate qualification.

4.2. The Analysis of Variance (ANOVA)

The one-way ANOVAs was performed to establish whether there are significant differences between the means of *Education level* and *Financial literacy*.

Table 2. Test of homogeneity of Education level

Test of Homogeneity of Variances					
Variable		Levene Statistic	df1	df2	Sig.(p)
Financial literacy	Based on Mean	3.727	4	98	0.007

The analysis commenced with the test for Homogeneity of Variance, as highlighted in Table 2, from which a significant difference (p = 0.007) was reported. To assess the overall differences between the variables in this case, the Welch Robust test of Equality of Means was used.

Table 3. Welch Robust test - Education level

Welch Robust Tests of Equality of Means				
Variable	Statistica	df1	df2	Sig.(p)
Financial literacy	3.945	4	36.399	0.009

Table 3 show that there is a statistically significant overall difference (p = 0.009) between the mean scores for *Financial literacy* and the *Education level* groupings. Given the presence of significant differences between these variables, the Games-Howell test multiple comparisons table (see Table 4) was used to identify where these differences lie. By considering the results of this analysis together with the descriptive statistics in Table 5, the following observations were made:

With regards to the mean score of *Financial literacy*, respondents who held a matric-level qualification, differed significantly from those who held a bachelor's degree (p = 0.035) and those who held post-graduate degrees (p = 0.025). As such, those respondents' holding a matric-level qualification ($\bar{x}$ = 3.8963), reported mean scores that were significantly lower than those with a bachelor's degree ($\bar{x}$ = 4.3789) and those who held post-graduate qualifications ($\bar{x}$ = 4.4418). Given these observations, it can be concluded that there is a statistically significant relationship between respondents' level of education and their financial literacy level. Therefore, SME owner-managers holding a matric certificate would be regarded as less financially literate than those holding a bachelor's degree or higher. This means that, the more educated an SME owner-manager is, the greater the likelihood of them being financially literate.

Table 4. Games-Howell test for Education level

Games-Howell test (Multiple Comparisons)					
Variable	(I) Education level	(J) Education level	Mean difference (I-J)	Std. Error	Sig.(P)
Financial literacy	< matric	Matric	-0.01132	0.23324	1
		Post matric Certificate/Diploma	-0.23395	0.24389	0.871
		Bachelor's Degree	-0.49393	0.23783	0.256
		Post-graduate degrees	-0.5568	0.23787	0.166
	Matric	< Matric	0.01132	0.23324	1
		Post Matric Certificate/Diploma	-0.22263	0.17024	0.688
		Bachelor's Degree	**-0.48261***	**0.16144**	**0.035**
		Post-graduate degrees	**-0.54548***	**0.1615**	**0.025**
	Post Matric Certificate/Diploma	< Matric	0.23395	0.24389	0.871
		Matric	0.22263	0.17024	0.688
		Bachelor's Degree	-0.25998	0.17647	0.585
		Post-graduate degrees	-0.32285	0.17653	0.384
	Bachelor's Degree	< Matric	0.49393	0.23783	0.256
		Matric	**0.48261***	**0.16144**	**0.035**
		Post Matric Certificate/Diploma	0.25998	0.17647	0.585
		Post-graduate degrees	-0.06287	0.16805	0.995
	Post-graduate Degrees	< Matric	0.5568	0.23787	0.166
		Matric	**0.54548***	**0.1615**	**0.025**
		Post Matric Certificate/Diploma	0.32285	0.17653	0.384
		Bachelor's Degree	0.06287	0.16805	0.995

(bold * = p<0.05)

From the above analysis, the hypothesis (H^1) which theorises that there is a significant relationship between *Education Level* and *Financial Literacy*, cannot be rejected and thus should be accepted.

4.3. Descriptive Statistics

Descriptive statistics were computed for the financial literacy and financial performance. The response categories were categorised as follows: responses from 1<=x<2.333 were categorised as disagree; 2.333<=x<3.667 were categorised as neutral; and 3.667<=x<=5.000 were categorised as agree.

Table 5. Descriptive statistics

Factor	Mean	Std. Dev.	Disagree %	Neutral %	Agree %
Intervening variable					
Financial Literacy	4.079	0.686	1.9	20.4	77.7
Dependent variable					
SMEs financial performance	3.549	0.777	4.9	52	43.1

From Table 5, *Financial literacy* returned the highest mean score of 4.079 but also the lowest standard deviation (0.686). Most respondents largely agreed (77.70%) that they were knowledgeable regarding the financial aspects of small business management and possessed the capability to effectively manage their businesses' finances. Also, 43.10% of the respondents agreed that their businesses are financially sustainable and had experienced growth in profits over the last two or more years. For this variable a mean of 3.549 and a standard deviation of 0.777 was returned.

4.4. Linear Regression

The linear regression analysis in Table 6 presents the influence of *Financial literacy* on the *SMEs financial performance*.

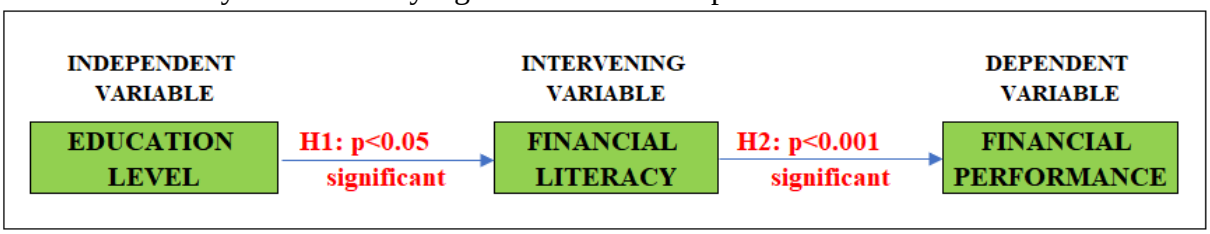
Table 6. Influence of the intervening variable on the dependent variable

Dependent variable: SMEs financial performance			**R-Square = 0.428**
Intervening variable	Beta	t-value	Sig. (p)
Financial literacy	**0.741**	**8.69**	**0.000*****

(* = p<0.001)**

The results of the regression analysis show that 42.80% of the variance in *SMEs financial performance* can be explained by *Financial literacy*. From this table it can be seen that a statistically significant ($p < 0.001$) positive relationship exists between *Financial literacy* and *SMEs financial performance*. This means that, with a beta of 0.741, SME owner-managers' financial literacy was a significant predictor of their SMEs' financial performance. As this relationship is positive, if *Financial literacy* increases by 1 unit, while keeping everything else constant, *SMEs financial performance* will increase by 0.741 units, therefore the hypothesis (H^2), which states that there is a significant relationship between *Financial Literacy* and *SMEs Financial Performance*, cannot be rejected, therefore the hypothesis should thus be accepted.

Table 7. Summary of statistically significant relationships



5. DISCUSSION OF THE MAIN FINDINGS

In the subsequent subsections the main findings of the study are presented.

5.1. Education level and financial literacy

This study found a statistically significant relationship between *Education level* and *Financial literacy*. The ANOVA that was performed indicated that respondents with higher levels of education returned higher mean scores than those respondents with less education.

These findings specifically revealed that respondents holding a post-graduate degree were more likely to be considered financially literate, relative to those respondents with a matric-level education. Hence, given the findings of the inferential statistics, it can be concluded that the more educated an SME owner-manager is, the greater the likelihood of them articulating behaviours akin to those regarded as financially literate.

5.2. Financial literacy and SME's financial performance

This study's empirical results revealed that there is a statistically significant relationship between the intervening variable *Financial literacy* and the dependent variable *SMEs financial performance*. To test this relationship a linear regression was performed. The results of this analysis indicated that a statistically significant and strong positive relationship was present between these variables. This implies that, an owner-manager's level of financial literacy has a direct influence on the financial performance of their business. Therefore, SMEs with financially literate owner-managers are expected to attain higher levels of performance, relative to those managed by owner-managers who are not considered financially literate. From these findings it may be inferred that, as SME owner-managers' financial literacy level increases, the financial performance of their businesses is also likely to increase.

6. CONCLUSION

The competitive nature of SMEs is continuously changing due to technological advancements in the current business environment. The ability of people to understand the importance of education, financial knowledge and skills in order to compete in this ever changing business environment has previously been underestimated, therefore the methodology applied in this study provided an objective and clear perspective of a logical approach to examining these important aspects of the business atmosphere.

From an economic perspective, this study highlights that the long-term profitability of SMEs requires owner-managers to be financially educated and literate to better equip them to manage their businesses' finances. It could therefore be concluded that the higher the education level of owner-manager, the higher the likelihood of better business financial performance.

ACKNOWLEDGEMENT

The author would like to acknowledge the contribution a master's degree student in the Faculty of Business and Economic Sciences at the Nelson Mandela University, Mr Sergio Malgas.

REFERENCES

Amagir, A., Groot, W., van den Brink, H.M., & Wilschut, A. (2018). A review of financial-literacy education programs for children and adolescents. Citizenship, Social and Economic Education, 17(1), 56-80.

Campo, M. A., & Barnes, L. (2017). An examination of financial literacy levels amongst owner/managers of small and medium-sized enterprises. [Online]. Available: https://research.avondale.edu.au/cgi/viewcontent.cgi?article=1013&context=bit_conferences Accessed [20 May 2021].

Collis, J., & Hussey, R. (2014). Business research: A practical guide for undergraduate and postgraduate students. London: Palgrave.

Dahmen, P., & Rodríguez, E. (2014). Financial Literacy and the Success of Small Businesses: An Observation from a Small Business Development Centre. Numeracy, 7(1), 1-12.

Eniola, A. A., & Entebang, H. (2016). Financial literacy and SME firm performance. International Journal of Research Studies in Management, 5(1), 31-43.

Falahati, L., Paim, L., Ismail, M. A., Haron, S. A., & Masud, J. (2011). Assessment of university students' financial management skills and educational needs. African Journal of Business Management, 5(15), 6085-6091.

Fiseha, G. G., & Oyelana, A. A. (2017). An Assessment of the Roles of Small and Medium Enterprises (SMEs) in the Local Economic Development (LED) in South Africa. Journal of Economics, 6(3), 280-290.

Fornero, E., & Monticone, C. (2011). Financial literacy and pension plan participation in Italy. Journal of Pension Economics and Finance, 10(4), 547-564.

Guliman, S. D. O. (2015). An Evaluation of Financial Literacy of Micro and Small Enterprise Owners in Iligan City: Knowledge and Skills. Proceedings of the 9th Global Business Conference, Philippines, 7 February 2015, 17-23. Manila: De La Salle University.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2013). Multivariate data analysis. New Jersey: Pearson Education Publishing.

Hilgert, M. A., & Hogarth, J. M. (2003). Household Financial Management: The Connection between Knowledge and Behaviour. Federal Reserve Bullet, 89(7), 309–322.

Hogarth, J. M., & Hilgert, M. A. (2002). Financial Knowledge, Experience and Learning Preferences: Preliminary Results from a New Survey on Financial Literacy. Consumer Interest Annual, 48(1), 1-7.

Kaiser, T., Lusardi, A., Menkhoff, L., & Urban, C. (2020). Financial education affects financial knowledge and downstream behaviours. Working Paper No. 27057. National Bureau of Economic Research. Cambridge.

Koning, F. F., & Harbor, W. H. (2013). Investigating retirement ability of high-net-worth individuals in South Africa. Proceedings of 2013 Actuarial Society of South Africa Conference, Sandton, 31 October - 1 November 2013, 1-38. Bloemfontein: University of Free State.

Lotto, J. (2020). Understanding sociodemographic factors influencing households' financial literacy in Tanzania. Cogent Economics & Finance, 8(1), 1-13.

Lusardi, A. (2019). Financial literacy and the need for financial education: evidence and implications. Swiss Journal of Economics and Statistics, 155(1), 1-8.

Lusardi, A., Mitchell, O. S., & Curto, V. (2009). Financial literacy among the young: Evidence and implications for consumer policy, Working Paper No. 15352. Pension Research Council, University of Pennsylvania. Philadelphia.

Mansor, M. F., Hong, C. C., Abu, N. H., & Shaari, M. S. (2015). Demographic factors associated with retirement planning: A study of employees in Malaysian health sectors. Asian Social Science, 11(13), 108-116.

Mutiso, A. D., & Muigai, R. G. (2018). An Assessment of Financial Literacy and the Performance of UWEZO Funded SME's in Kirinyaga County, Kenya. Journal of Economics and Sustainable Development, 9(6), 10-17.

Nanda, S., & Panda, A. K. (2017). The determinants of corporate profitability: an investigation of Indian manufacturing firms. International Journal of Emerging Markets, 13(2), 66-86.

National Financial Educators Council. (2020). Impact of Financial Literacy. [Online]. Available: https://www.financialeducatorscouncil.org/impact-of-financial-

literacy/#:~:text=Financial%20Literacy%20Changes%20Lives&text=There%20are%20abundant%20studies%20that,just%20to%20name%20a%20few. [10 January 2020].

Neneh, N. B., & van Zyl, J. H. (2012). Achieving optimal business performance through business practices: evidence from SMEs in selected areas in South Africa. Southern African Business Review, 16(3), 118-144.

Ngek, N. B. (2016). Performance implications of financial capital availability on the financial literacy – performance nexus in South Africa. Investment Management and Financial Innovations, 13(2), 354-362.

OECD. (2013). Financial literacy and inclusion. [Online]. Available: https://www.oecd.org/daf/fin/financial-education/TrustFund2013_OECD_INFE_Fin_Lit_and_Incl_SurveyResults_by_Country_and_Gender.pdf Accessed [14 June 2021].

Ooko, R. A. (2017). Demographic and Socioeconomic Factors Influencing Financial Literacy Among Employees of Deloitte Kenya. Nairobi: United States International University. MBA-Dissertation.

Rai, K., Dua, S., & Yadav, M. (2019). Association of Financial Attitude, Financial Behaviour and Financial Knowledge Towards Financial Literacy: A Structural Equation Modelling Approach. FIIB Business Review, 8(1), 51-60.

Ribeiro-Soriano, D., & Castrogiovanni, G.J. (2012). The impact of education, experience and inner circle advisors on SME performance: insights from a study of public development centres. Small Business Economics, 38(1), 333–349.

Salkind, N. J. (2010). Encyclopaedia of research design. Los Angeles: Sage Publication.

Schober, P., Boer, C., & Schwarte, L. (2018). Correlation Coefficients: Appropriate Use and Interpretation. Anesthesia & Analgesia, 126(5), 1763-1768.

Siekei, J., Wagoki, J. W., & Kalio, A. (2013). An Assessment of the role of financial literacy on Performance of Small and Micro Enterprises: Case of Equity Group Foundation Training Program on SMES in Njoro district, Kenya. World Academic Journal of Business & Applied Science Journal of Economics & Finance, 1(7), 250-261.

Treptow, E. (2014). Financial Intelligence: A Manager's Guide to Knowing What the Numbers Really Mean by Karen Berman and Joe Knight with John Case. Journal of Business & Finance Librarianship, 19(2), 172-174.

Usama, K. M., & Yusoff, W. F. W. (2019). The Impact of Financial Literacy on Business Performance. International Journal of Research and Innovation in Social Science, 3(10), 84-91.

Wisniowski, A., Sakshaug, J. W., Ruiz, D. A., & Blom, A. G. (2020). Integrating Probability and Nonprobability Samples for Survey Inference. Journal of Survey Statistics and Methodology, 8(1), 120-147.

Young, J. H., Hudson, C. R., & Davis, E. L. (2017). A Survey of Retirement Readiness among African Americans. Journal of African American Studies, 21(4), 551-566.

Zait, A., & Bertea, P. E. (2014). Financial Literacy – Conceptual Definition and Proposed Approach for a Measurement Instrument. Journal of Accounting and Management, 4(3), 37-42.

Zaleskiewicz, T., & Traczyk, J. (2020). Psychological Perspectives on Financial Decision Making. Switzerland: Springer Nature Switzerland AG.

Volume XIX, Issue (1) (2023) 22-31

International May Conference on Strategic Management

FINANCIAL MANAGEMENT PRACTICES AND ECONOMIC GROWTH IN NIGERIA

Oyewobi Ifeoluwapo Adebimpe, Ajose Oluwafemi*

Bingham University Karu, Nigeria

Abstract: In the current and ever-changing financial environment, financial management practice is a key contributing factor to the growth of the public sector. This study examined the effect of financial management practice proxy by capital and recurrent expenditure on economic growth proxy by GNP in Nigeria. The ex-post facto research design was adopted with the population of all capital and recurrent expenditure budget of Nigeria from independence till date, out of which 27 years from 1996-2022 were sampled. Time series regression analysis was adopted using secondary data sources from microtrent.com and the Central bank of Nigeria official bulleting. Time series regression analysis was used to analyse results using E-views 10. The result showed that capital expenditure and recurrent expenditure collectively and individually have a positive and significant effect on GNP. Therefore, the study recommends Government of Nigeria should improve on its capital and recurrent expenditures as both are key tools to the economic growth of Nigeria.

***Keywords*:** Capital Expenditure, Economic Growth, Financial Management Practice, Public Sector, Recurrent Expenditure

1. INTRODUCTION

The economic growth of any public sector depends immensely on the financial management practices adopted by the country (Adegbie & Alawode, 2020). Financial management practice is critical to the successful growth of any country in the face of a global economic downturn which greatly affects economic growth and development. A country can only attain economic growth with a good financial management system for its public expenditures (Ahmed et al., 2010). The significance of financial management as a key factor to economic growth is also confirmed by (Tajudeen & Ismail, 2013) when they stated that financial management practices are a key factor in attaining economic growth and development of any nation.

The relationship between financial management practice and the economic growth of the public sector in Nigeria has continued to generate serious debate. The government of Nigeria performs two major functions, security of life and properties and provision of social amenities. The Nigerian public sector is also critical in creating jobs and social investment programs to enhance economic growth. Financial management practice of the public sector in Nigeria has been a big contentious issue despite its significant role in economic sustainability and growth of Nigeria's economy. The successful management of capital expenditure and recurrent expenditure depends on the financial management system in place (Adegbite & Alawode,

* *Corresponding author: oluwafemiajose@yahoo.com*

2020). For example, expenditure incurred on the construction of roads and other physical infrastructure is classified under capital expenditures, while expenditures incurred on maintenance and servicing of government are classified as recurrent expenditures.

Despite the huge amount of expenditure incurred by the government of Nigeria, economic growth has graciously declined into recession in recent times. This menace is due to government officials' lack of accountability, corruption and embezzlement. The decline in economic growth in Nigeria in recent times is also attributed to the fact that most of the public expenditures budget in Nigeria is on recurrent expenditures. The government of Nigeria, since 1999, has engaged in external borrowing to service recurrent expenditures such as salaries and other overhead payments instead of self-generating capital expenditure. Several studies, such as (Abu, & Abdullah, 2010), (Adegbite, & Alawode, 2020) and (Okpala, 2012) that have conducted a study on financial management practices in Nigeria's public sector have always shown mixed results on financial management practice and economic growth. Most of these studies have yet to examine the effect of financial management practice on the economic growth of Nigeria.

Moreover, most of Nigeria's financial management practice studies are based on the private sector. Only some studies have been carried out regarding financial management practices in the public sector. Hence, there is a need to carry out an empirical study that utilises a broader data set and timeliness on financial management practices and the economic growth of Nigeria. The basic hypotheses underlying these studies are stated thus:

$H0_1$: Capital expenditure has no significant effect on the economic growth of Nigeria.
$H0_2$: Recurrent expenditure has no significant effect on the economic growth of Nigeria.

2. LITERATURE REVIEW

2.1. Conceptual Framework

2.1.1. Financial Management Practice

Financial management is an integral part of overall management, concerned with financial managers' duties in managing a firm. "It is concerned with efficiently using an important economic resource, namely, capital funds". Also, it can be expressed "as an application of general managerial principles to financial decision-making. Financial management practices are the main activities for the success of a small business (Vohra & Dhillon, 2014). It covers various objectives starting with cost calculation, cost control, debt equity management, sales and profit maximisation to attain a firm's market value and overall corporate objectives (Vohra & Dhillon, 2014). Financial management practices have been the lifeblood of any business organisation. It involves meeting the requirement of the business concern. Every business must maintain an adequate amount of finance for the smooth running of the business and also maintain the business carefully to achieve the goal of the business concern. The business goal can be achieved only with the help of effective financial management. The importance of financial management must be addressed in the skim of business operations at any time and in any situation.

2.1.2. Capital Expenditure

Capital expenditures are those incurred for high-value items that fulfil long-term requirements (Kanu et al., 2021). These expenditures are also called long-term expenditures.

Capital expenditure is any expenditure to buy a non-current asset, i.e. any asset with more than one year of life. Because these expenses are very valuable and long-lasting, they qualify as long-term expenditures. The four categories of capital expenditures are acquiring fixed and intangible assets, upgrading an existing asset, repairing an existing asset, and loan repayment. The government's capital expenditure is setting up schools, colleges, hospitals, bridges, roads, and airports. The defence expenditures like purchasing a fighter jet or tanks are also capital expenditures.

2.1.3. Recurrent Expenditure

Recurrent expenditure refers to all payments other than for capital assets, including goods and services (wages and salaries, employer contributions), interest payments, subsidies and transfers. Recurrent expenditures are those expenses that do not result in the creation of assets. Recurrent expenditures are short-term expenditures within a year (Olaoye & Orimogunje, 2022). When a smartphone is purchased, it is a capital expenditure, but the expenditure incurred for recharge is revenue expenditure. In the corporate world, revenue expenditure is any expenditure incurred to operate the business on a day-to-day basis. It includes daily running expenses such as rent, electricity, or any expenditure to maintain an existing asset. Wages and salaries to staff are also revenue expenditures.

2.1.4. Economic growth

According to Ogbulu & Torbira (2012), economic growth is the steady increase in the production of goods, services, and employment opportunities to enhance the economic and financial well-being of the populace. Economic growth is described by Hardwick, Khan, and Langmead (1994) as an increase in a nation's productive potential that may be seen in a consistent rise in real national income. Economic growth is an important topic and is viewed as one of the prerequisites for improving social welfare outcomes, which is the major goal of economic policy. As a result, it is a crucial component of sustainable development. Gross Domestic Product serves as a proxy for economic growth (GDP). As a result, GDP is defined in this study as the total monetary value of all commodities and services generated in an economy over a given period, often one year.

2.1.5. Gross National Product

Gross National Product (GNP) estimates the total value of all the final products and services in a given period using production owned by a country's residents (Olaoye & Orimogunje, 2022). GNP is commonly calculated by taking the sum of personal consumption expenditures, private domestic investment, government expenditure, net exports, and any income earned by residents from overseas investments, then subtracting income earned by foreign residents. Net exports represent the difference between what a country exports minus any imports of goods and services. GNP is related to another important economic measure called gross domestic product (GDP), which considers all output produced within a country's borders regardless of who owns the means of production. GNP starts with GDP, adds residents' investment income from overseas investments, and subtracts foreign residents' income earned within a country. GNP measures the total monetary value of the output produced by a country's residents. Therefore, any output produced by foreign residents within the country's borders must be excluded from GNP calculations. In contrast, any output produced by the country's residents outside its borders must be counted.

2.2. Empirical Review

Emmanuel & Playmaster (2022) examined the relationship between financial management difficulties and financial institution performance in Nigeria. A survey research design was employed with a population of all listed financial institutions in Nigeria. The questionnaire was the major data-gathering tool. A Spearman Rank Correlation Coefficient Statistic was used to test the hypotheses based on the obtained data. The study's findings suggest that Nigeria's lack of financial competence has a beneficial and substantial impact on the country's banks. There is a correlation between the lack of financial policies in Nigeria and the lack of financial institutions. Nigeria's financial institutions' lack of monitoring and control has a positive and substantial correlation. There is a clear and substantial correlation between financial mismanagement and financial institution performance; according to the findings of the research, it was recommended that management should also consider expanding the financial expertise, financial policies, and monitoring and control programs to cover all departments and reviews done to ensure the programs are relevant. The study used a questionnaire to collect data which could lead to dishonest answers among the respondents, and the results and recommendations might bring incorrect feedback.

Okyere et al. (2018) investigate the Impact of Financial Management Practices on the Growth of Small and Medium Scale Enterprises in Ghana: The Case of Birim Central Municipality. The specific objectives of the study were to ascertain the type of bookkeeping practice of SMEs. The study concluded that most of the respondents sometimes practice financial management. The results further revealed that most respondents agreed with the importance of financial management practices' importance. It was deduced from the data obtained that most respondents use more of the cash book and sales day book than the other type of bookkeeping. The following recommendations were given based on the objectives; that series of financial training programmes should be arranged for SMEs to enable them to sharpen and enhance their little financial skills and to help them in their operations; that SMEs will engage the services of professionals accountants to manage their finances and to help put the business on track; that external auditors be allowed to audit the accounts of the SMEs; that deposits of SMEs. This study centred on SMSE in Ghana. Therefore the findings and recommendations may not apply to the public sector in Nigeria.

Kanu and Nwaimo (2015) examined capital expenditure, and Gross fixed capital formation in Nigeria. This study has made us understand that capital expenditures have a significant negative relationship with Gross Fixed Capital Formation (GFCF) at 1% and 5% Alpha levels. The result did not come as a surprise, seeing that a 31-year simple average of capital expenditures for 1981- 2011 accounted for about 32% of Nigeria's total expenditure profile; while the remaining balance went to recurrent expenditures. No nation has ever trodden the path of growth and development with this burgeoning level of recurrent expenditures. It calls for caution and a national rethink. Based on the study's findings, we recommend that the federal government of Nigeria cut down on its recurrent expenditure profile. The trend of 68: 32 % allocations to recurrent and capital expenditures, respectively, MUST stop. That is not in any way acceptable. This study was carried out in 2015. Based on the timing gap, Nigerian capital and recurrent budget have increased in geometric progression. As such, the findings and recommendations of 2015 may not be applicable in 2023.

2.3. Theoretical Framework

2.3.1. Musgrave Theory of Public Expenditure Growth

This theory was propounded by Musgrave (1959). The theory explains the three functions of public expenditures: allocating public goods, redistributing income, and stabilising the economy. The provision of public goods was intended to satisfy social wants and merit wants. Musgrave as he found changes in the income elasticity of demand for public services in three ranges of per capita income. He posits that at low levels of per capita income, demand for public services tends to be very low; this is so because, according to him, such income is devoted to satisfying primary needs, and when per capital income starts to rise above these levels of low income, the demand for services supplied by the public sector such as health, education and transport starts to rise, thereby forcing the government to increase expenditure on them. He observes that at the high levels of per capita income, typical of developed economies, the rate of public sector growth tends to fall as the more basic wants are satisfied.

This study was anchored on Musgrave theory of public expenditure simply because; economies in an early development stage are faced with a high demand for public capital formation to install a basic infrastructure. At later development phases, institutions for private capital formation become more developed and therefore, the share of public expenditure may decrease.

3. METHODOLOGY

The research study adopts the expo factor research design, and the study's variables were derived from secondary data sources, Macrotrend.com. The time series data was used, covering 1996 to 2022. This study uses the gross national product (GNP) as a proxy for economic growth. Financial management practices are proxies by capital expenditure, and recurrent expenditure is used as the explanatory variable. The population of the study covers all public expenditures of Nigeria from independence, out of which 27 years of public expenditure were sampled from 1996-2022. The choice of 1996 is based on data available to make the study timely and relevant to today's business world. The estimating method used in this study to assess the effect of financial management practices on the economic growth in Nigeria is a multiple regression analysis using the ordinary least square (OLS). The model to measure the effect of financial management practices on Nigeria's economic growth variables is described below. The dependent variable is Gross National Product, and the independent variables are capital and recurrent expenditure.

$$GDP = \beta o + \beta 1CAPEX + \beta 2REX + €I \quad (1)$$

Where:

βo =The autonomous parameter estimate
β1-β2=Parameter coefficient of Portfolio Management
GNP = Gross National Product
CAPEX = Capital expenditure
REX = Recurrent expenditure
€it = Stochastic Error term

4. RESULTS AND DISCUSSION

4.1. Results

4.1.1. Descriptive Statistics

Descriptive statistics present variables' mean, median, maximum and minimum values and their standard deviations. The variable was analysed using the E-view 10 software for the period under Review.

Table 1. Descriptive Statistics Eview 10 output (Authors calculations)

	GNP	CAPITAL EXP	RECURRENT EXP
Mean	11.14990	12.09573	12.09573
Meadian	11.47090	12.21139	12.21139
Maximum	11.71429	12.83947	12.83947
Minimum	9.025870	10.68124	10.68124
Std.Dev	0.718875	0.537667	0.537667
Skewness	-1.964126	-0.939128	-0.939128
Kurtosis	6.261290	3.331392	3.3313292
Jarque-Bera	29.32557	4.092370	4.092370
Probability	0.00000	0.129227	0.129227
Sum	301.0472	326.5846	326.5846
Sum sq.Dev	13.42875	7.516226	7.516226
Observation	27	27	27

Table 1 above presents descriptive statistics of the effect of financial management practice on Nigeria's public sector's economic growth during 1996-2022. The table shows that GNP as a measure of economic growth has a mean of 11.14990 with a standard deviation of 0.718673. In contrast, capital and recurrent expenditures have a mean of 12.09573 and 12.0957, with a standard deviation of 0.537667. The minimum and maximum values of GNP during the study period are 9.025870 and 11.71429, respectively. These values imply that some sampled selected during the study period stood at 27.

4.1.2 Correlation Matrix

The correlation matrix is used to analyse the relationship between two variables; it ranges from -1 and +1

Table 2. Correlation Matrix Result Eview 10 output (Authors calculations)

Correlation probability	GNP	CAPITAL EXP	RECURRENT EXP
GNP	1.000000		
	-		
CAPITAL_EXP	-0.613108	1.000000	
	0.0007	-	
RECURRENT_EXP	0.913885	-0.843889	1.000000
	0.0000	0.0000	-

The person correlation (r) was employed to establish the measures of associations between the variables. The correlation shows the relationship between financial management practices (CAPEXP & RECEXP) and economic growth (GNP). The result shows that the correlation coefficient between GNP and CAPEXP is -0.613108, which is negatively correlated. The result implies that an increase in GNP will lead to a decrease in CAPEXP by 61%. It is supported by its p-value, which stood at 0.0007, stating that the correlation is significant at 5%. Likewise, the coefficient of correlation between GNP and RECEXP is 0.913885, which is positive and has a p-value of 0.0000.

4.1.3. Unit Root Test

Augmented Dickey – (Fuller ADF) test was used to determine the unit root properties in the variable. The decision rule for ADF states that ADF statistics value must be greater than the Mackinnon critical value at absolute term for stationarity to be established at the level, and if otherwise, differencing occurs.

Unit Root Test (GNP at level) - A unit root test was carried out and the ADF shows that the probability value under the ADF is 0.0024, which is less than 5% at the level. It implies that GNP (dependent) variable was stationary at level. The ADF t-statistics (4.317561) is higher than the absolute value (3.711457) at 5%. It implies that the null hypothesis must be rejected, and it can be concluded that GNP has no unit root and the data is stationary at the level.

Unit Root Test (CAEXP at ^{first} difference) - In respect of capital expenditure, a unit root test was carried out and the probability value of the ADF t-statistics (3.228610) is higher than the critical value (2.986225) at a 5% significance level. It implies that the null hypothesis is rejected, and it can be concluded that CAEXP has no unit root and the data is stationary at ^{first} difference.

Unit Root Test (RECEXP at Level) - Recurrent expenditure unit root test table shows that the probability value of the ADF t-statistics (4.154465) is higher than the critical value (2.986225) at a 5% significance level. It implies that the null hypothesis is rejected, and it can be concluded that RECEXP has no unit root and the data is stationary at level.

4.1.4. ARDL Bound Test

The order of integration under the unit root test is recognised, and the next step is establishing the long-run relationship among the variable by carrying out the bound test.

Ho: there is no long-run relationship.

H1: there is the long run relationship

Decision rule: Reject the Null hypothesis if the F-value is greater than the critical value of the upper bound I(I), Then we conclude there is cointegration i.e there is a long-run relationship.

From the bound test carried out, the table shows that, the F-statistics (16.18310) is higher than the upper bound at I(I), (3.87) at a 5% level of significance. It, therefore, means that the null hypothesis is rejected.

4.1.5. Robustness Test

In order to validate the robustness of the estimates, the multicollinearity test was conducted, using the Variance Inflation Factor (VIF) as a diagnostic check. The centred VIF is less than 10, and it is an indication of the absence of multicollinearity. Heteroskedasticity test results showed that the Obs R-squared pro. The Chi-square value is 0.0940, greater than 0.05; thus, the study concludes that the model is free from heteroskedasticity problems. Lastly, the Serial Correlation Test was conducted and based on the breach-Godfrey serial correlation LM TEST result, the Obs R-squared probability chi-square value of 0.8071 is greater than 0.05. Thus, the study concludes that the regression model is free from serial correlation problems.

4.1.6. Test of Research Hypothesis (GNP)

$H0_1$: Capital Expenditure does not significantly affect the economic growth of Nigeria.
$H0_2$: Recurrent Expenditure does not significantly affect the economic growth of Nigeria.
Decision Rule: If the PV is less than 5% or 0.05(that is, if PV <0.05), it means that the regressor in question is statistically significant at a 5% level, and if PV is more than5% or 0.05(that is, if PV> 0.05), It is categorised as not significant at the level. It implies that the study's significance level is at 5%. The results of the estimated regression model with a specific focus on GNP as a dependent variable are presented below:

Table 3. Regression Results (Hypothesis) E-View 10 Output (Authors calculations)

Variable	Coefficient	Std Error	t-Statistic	Prob
C	-20.00040	3.298605	-6.063291	0.0000
CAPITAL_EXP	0.734192	0.141998	5.170423	0.0000
RECURRENT_EXP	1.841122	0.141998	12.96579	0.0000
R-squared	0.922033	Mean deviation		11.14990
Adjusted R-squared	0.915536	S.D deviation		0.718673
S.E of regression	0.208866	Akaike info criterion		-0.189809
Sum squared resid	1.046999	Schwarz criterion		-0.045827
Log likelihood	5.562423	Hannan- Quinn criter		-0.146996
F-statistic	141.9112	Durbin-Watson stat		1.700478
Prob(F-statistic)	0.000000			

From the table above, the coefficient of multiple determinations (R^2) is 0.922033. It indicates that about 92% of the total variations in gross national product are explained by the variations in the independent variable's capital expenditure and recurrent expenditure. In comparison, the error term captures the remaining 8% of the variation in the model. It indicates that the line of best fit is highly fitted. The standard error test is applied to measure the size of the error and determine the degree of confidence in the validity of the estimates. Usually, if the standard error is smaller than half of the numerical value of the parameter estimate, it can be concluded that the estimate is statistically significant. Having carried out a standard error test on the parameters estimated and as also indicated by their respective probability values, the parameter estimate for CAEXP is statistically significant, given that the individual probability is 0.0000, which is just less than 5%. At the same time, RECEXP is also statistically significant, given that the individual probability is 0.000. In other words, the empirical analysis of the study shows that there is evidence to take the following position:

The hypothesis that CAEXP does not significantly affect Nigeria's economic growth is rejected at this moment.

The hypothesis that RECEXP does not significantly affect the economic growth of Nigeria is hereby rejected.

4.2. Discussion of Findings

This study examined the effect of financial management practice on the economic growth of Nigeria's public sector, using time series data and a regression analysis approach. The independent variables of the financial management practice were proxy by capital expenditure and recurrent expenditure for 27 years from 1996-2022, while the study's economic growth (used GNP) was the dependent variable. The effect of the independent variable on the dependent variable was analysed in terms of strength and significance, and the time series analysis was used to compare the relationship among the variables.

The result of the model of the study showed that capital expenditure and recurrent expenditure collectively and individually have a positive and significant effect on GNP taken as a measure of economic growth. Empirical evidence suggests that the attributes exhibited by the CAEXP and RECEXP should naturally promote efficiency and economic growth. The study's findings agree with the position of Emmanuel & Playmaster (2022) who investigated the effect of financial management practice and firm value in Nigeria. The study, however, disagrees with the result of Kanu and Nwaimo (2015), who says capital expenditures have a significant negative relationship with Gross Fixed Capital Formation (GFCF) and economic growth in Nigeria.

5. CONCLUSION AND RECOMMENDATIONS

Therefore, the study concludes that capital and recurrent expenditures have a significantly positive effect on the gross national product in Nigeria. It was shown from the result of the analysis reveals that public expenditure in Nigeria promotes efficiency and economic growth. Public expenditure in Nigeria is one of the major contributors to the economic growth of Nigeria. The study recommends, based on the findings:

1. Nigeria's government should improve their capital expenditure as a key tool to economic growth to ensure economic sustainability.
2. The Recurrent expenditure should be tailored towards those sectors that contribute immensely to the economic growth of Nigeria.

REFERENCES

Adegbie, F. F., & Alawode, O. P. (2020). Financial Management Practices and Performance of Small and Medium Scale Poultry Industry in Ogun State, Nigeria. Journal of Finance and Accounting, 8(2), 90-106.

Ahmed, I. H., Babar, Z. B., & Kashif, R. (2010). Financial management practices and their impact on organizational performance. World Applied Sciences Journal, 9(9), 997-1002.

Emmanuel, A., & Paymaster, F. B. (2022). Financial management challenges and performance of financial institution in Nigeria. Global Scientific & Academic research journal of Economics, Business & Management, 1(1), 8-19.

Hardwick, P., Khan, B., & Langmead, J. (1994). An Introduction to Modern Economics (4th ed.), England: Longman Group Ltd.

Kanu, S.I, & Nwaimo C.E. (2015). Capital expenditure and Gross fixed capital formation in Nigeria. Research Journal of Finance and Accounting, 6(12), 188-197.

Kanu, S.I., Obi, H. K., & Akuwudike, H. C. (2021). Impact of public sector financial management on the Economic Growth of Nigeria. International Journal of management science and Business Administration, 7(4), 45-59.

Musgrave, R. A. (1959). Theory of public expenditure-A study in public Economy. New York: Mc Graw-Hill.

Ogbulu, O. M., & TorbIra, L. L. (2012). Budgetary Operations and Economic Growth: The Nigerian Perspective. British Journal of Arts and Social Sciences, 4, 181-191.

Okpala, K. E. (2012). Fiscal accountability dilemma in Nigeria public sector: A warning model for economic retrogression. Research Journal of Finance and Accounting, 3(6), 113-131.

Okyere, B., Obeng, A., Adjei, F., & Hope, E. (2018). Impact of Financial Management Practices on the Growth of Small and Medium Scale Enterprises in Ghana. International Journal of Innovation and Research in Educational Sciences, 5(2) 177-184.

Olaoye, F. O., & Orimogunje, F. S. (2022). Assesses Public Financial Management and Economic Development in Nigeria. Academic Journal of Accounting and Business Management, 3(2), 19-40.

Tajudeen, E., & Ismail, F. (2013). Public Expenditure & Economic growth in Nigeria. Zagreb International Review of Economics & Business,16(1), 79-92.

Vohra, P.S., & Dhillon, J. S. (2014). Best Financial practice, Lead financial performance of SMES. International Journal of Accounting & Financial Management Research, 4(3), 5-16.

Volume XIX, Issue (1) (2023) 32-38

International May Conference on Strategic Management

WOMEN IN ORGANIZING AND MANAGING OWN BUSINESS: EVIDENCE FROM RUSSIA AND KAZAKHSTAN

Marina Sheresheva[1], Iurii Vladimirov[1], Daniel Pavlov[2*]

[1]Lomonosov Moscow State University, Russia; [2]University of Ruse "Angel Kanchev", Bulgaria

Abstract: This paper examines the role of women in the management of Russian and Kazakhstani family-owned small and medium-sized enterprises (SMEs) and the relationship with sole or shared ownership of SMEs. The authors first explore the factors and motivations that influenced the decision to become a business owner and highlight the key features of the development of women-led family-owned SMEs. Then they present and discuss the empirical data obtained through a series of in-depth interviews with female business owners, respondents from family-owned SMEs, who agreed to disclose information about themselves, their family and their business. The used questionnaire is a synthesis of the basic INTERGEN project questionnaire combined with questionnaire elaborated by authors and allowing to adapt the basic questions to the social and cultural characteristics of Russia and Kazakhstan, as well as taking into account the realities of the post-COVID situation and subsequent political instability. The main findings show commonality among the respondents, including a strong sense of duty to one's own family, priority given to children, categorical denial of doing business with "friends" and skepticism about doing business with relatives. The analysis leads to the conclusion that Russian and Kazakhstani women's family-owned SMEs form competitive advantages based on building a network of mutually beneficial partnerships and networking, well-established quality control methods and compliance with their own obligations, intentional development of contacts leading to mutually beneficial cooperation; active use of e-commerce, digital CRM platforms and social networks (Instagram). Women business owners showed knowledge of modern digital technologies at a high level, a desire for self-education and improvement of business skills, while clearly demonstrating the ability to negotiate and solve problems through negotiations. This makes women highly valuable members of their own or shared family businesses.

***Keywords*:** family business, SMEs, competitiveness, business, women, Russia, Kazakhstan

1. INTRODUCTION

The problems and perspectives of family businesses that represent the oldest and the most common form of organizations are a specific area of research (Sharma & Nordqvist, 2008; Ramadani et al., 2020). In such firms, ties of kinship and other specific formal and informal norms are of high importance for employees, as well as social and psychological ties.

As to small and medium-sized family firms, to achieve long-term competitiveness they need to draw attention to a number of issues not faced by non-family-owned SMEs (Pavlov et

* *Corresponding author: dpavlov@uni-ruse.bg*

al., 2017; López-Pérez et al., 2018; Pavlov et al., 2020). A key difference compared to non-family-owned SMEs is the need to take into account such a factor as family values (Werner et al., 2018; Shi et al., 2019), namely the interaction between generations, honouring elders, respect for family traditions, and taking into account the opinions of juniors. Based on the empirical research in the literature, leadership disagreements and succession issues are crucial for family-owned SMEs, in addition to the lack of investment that is common to any small enterprise (Buang et al., 2013; Ward, 2016; Yedder, 2018; Tan et al., 2021). Family members are one of the most important "natural forces", and if you ignore it, it inevitably weakens the business (Sheresheva et al., 2022).

In this regard, the role of women in small and medium-sized family businesses has increasingly attracted interest from researchers (Muthathai, 2017; Maxson, 2019; Haynes et al., 2021). In the conditions of a changing social and cultural paradigm, political instability and economic uncertainty, as well as thanks to digitalization, women in business are facing new challenges and opportunities that allow them to assert their own role and achieve competitiveness in local and global markets.

In this article, we present the results of an empirical study on the competitiveness of Russian and Kazakhstani family-owned SMEs, where women play a key role in ownership and management. The main goal was to identify the factors and features of doing business by women that help family-owned SMEs in Russia and Kazakhstan not only survive in conditions of economic and political turbulence but also develop with the hope for a better future for themselves and their children.

This research has been done to enrich the expertise of the international academic network INTERGEN on the role of the intergenerational family businesses as a stress management instrument for entrepreneurs.

2. MATERIALS AND METHODS

Based on the analysis of the literature on the role of women in family business, we have identified the main factors influencing the effective growth of a company in the era of digitalization. Gundry et al. (2014) underline five key ingredients for success featuring SMEs where women are owners or play a dominant role:

- *Well considered risk appetite*. It is an element of the personality of entrepreneurs, which is considered critical for making a decision to start a business career;
- *Entrepreneurial intensity*. It is defined as a combination of the frequency of entrepreneurial activities and the degree of entrepreneurship, which is defined by three dimensions: innovation, risk taking and initiative (Morris & Sexton, 1996);
- *Recognition of business opportunities*. The process that helps entrepreneurs and enterprises identify potential methods for developing their ideas or starting new ventures. This gives entrepreneurs the opportunity to constantly brainstorm new and better ideas;
- *Emphasis on innovation*. More innovative SMEs are more productive SMEs that can pay higher wages and offer better working conditions to their workers, thus reducing inequality;
- *Sustainable development*. For SMEs, it can be defined as a concept and practice applied by small, micro and medium-size enterprises that embrace doing business in a socially responsible manner in relation to how they treat local and global social, environmental and economic issues.

Bruno et al., (2013) produced the following key findings:

- There is a link between those who have higher growth expectations and comfortable risk taking. Those in the higher growth segment were also more likely to mention marketing efforts as a growth strategy more frequently.
- Women in the “kids at home” situation are more likely to focus on personal risks, such as free time and family finances. Women business owners have a holistic view of work and personal life.
- What is defined as "success" for business owners may well depend on life circumstances and cultural preferences. Women business owners may set success markers from the start of business ownership differently than their male counterparts, leading to different outcomes. If women achieve what they consider achievable success, then they may not go beyond that point given the compromises they think they will have to make.
- As a rule, women business owners tend to be risk averse. This is likely due cultural expectations that lead women to combine social and business roles. In general, women are still expected to take care of many household chores, including childcare, which seems to result in women having less energy and time to grow their business. Women can also carry this perception over to the workplace, where they try to manage their business the same way they manage their personal lives - balancing between competing tasks and not expecting help from others;
- Owner’s financial literacy (business education) is not a prerequisite for business growth, is not related to business growth risk tolerance and risk tolerance, and is not a factor in determining expectations. What is more important is the owner's knowledge that proper attention to finance is an important component of the business model, and that someone must fulfill this role in running the company and expanding it.

To obtain empirical data, we selected representatives of women owners of businesses in Russia and Kazakhstan as respondents. The target group was the women entrepreneurs who agreed to fill out survey questionnaires and give detailed interviews. The questionnaire consisted of questions and statements adapted to the realities of 2023 from the INTERGEN project (Bakracheva et al., 2020). The answers to each statement were given on a five-point Likert scale ("no", "rather no", "don't know", "rather yes", "yes"). The selection criteria were as follows: the business survived the COVID situation and/or the political turbulence of Russia or Kazakhstan in 2022; family or family members own more than 50 percent of the company shares; one or two family members actively involved in the company management; and willingness to expand interview via videoconference (Zoom) with recording and subsequent transcription. The format of the interview included 12 questions, and the respondents could express themselves on them in free form, give extended comments and reveal their emotional attitude to the topic of the questions. Not all respondents were ready to give up the conditions of anonymity. Only those who were completely ready to reveal their identity, name and business profile were included in the final study.

3. RESULTS AND DISCUSSION

3.1. Intergenerational relationships and interactions with parents

According to the survey results, most respondents value close relationships with family members who are always supportive. However, this statement has its own peculiarities: women entrepreneurs clearly differentiate their family members and relatives. That is, in the vast majority of cases (75%), the husband, wife and children perceived as the “primary” family,

while parents, siblings, own relatives, husband's parents are not. Therefore, the concept of a family that we used in a number of the INTERGEN project studies required mandatory clarification in this case.

Here are other results related to the topic of business interaction with relatives (as with a kind of "big family"), where female respondents indicated that they:

- would rather not want to have a joint business with close relatives;
- do not want to see their parents (or husband's parents) as employers.

Only 1/3 of respondents are ready to consider their parents (or husband's parents) as suppliers or contractors. At the same time, half of the respondents are sure that they can count on financial support from their parents in the form of investments in business development.

All respondents indicated high levels of stress connected to running their own business. At the same time, however, they maintain a high level of optimism:

"*I am glad that we have work. The good news is that in spite of everything, we are on our feet, we have orders and we can pay wages. Covid was a test of strength…".*

Characteristically, survey participants consider well-established relationships with their parents as a way to reduce significantly the overall stress level. At the same time, they completely and categorically reject the possibility of their parents' participation in their business, not considering such participation as an opportunity to reduce this stress. More than 90% of respondents do not agree that the level of risk and uncertainty of doing business in Russia and Kazakhstan can be reduced by having parents act as suppliers/contractors.

3.2. Interaction with friends and acquaintances

The survey and interview results showed that attracting friends as business partners causes an ambiguous reaction. In general, almost 90% of respondents, both in Kazakhstan and in Russia, are convinced that friends and girlfriends have no place in business, neither in the form of partners, nor as employees:

"*You can start a business with a partner, and then he may become a friend; on the contrary, no*" (respondent from Russia).

More than half of the respondents noted that they had a negative experience working with friends in business:

"I started a business with a partner friend, and as a result I lost both my partner and my friend, we don't communicate anymore" (respondent from Kazakhstan).

All survey participants agreed that their friends and acquaintances did not help them develop their business. More than 63% of respondents agree that exchanging opinions and experiences with acquaintances is appropriate in some areas, for example, in IT solutions.

At the same time, great attention is drawn to building relationships and maintaining business relationships, time and resources are spent on this. Many firms (>60%) reward employees for innovative ideas and advance their careers. 35% of respondents discuss the development of companies during breaks and lunches. This is an indicator of a friendly team atmosphere. One woman from Russia even developed a special ritual of having joint lunch in the office on Fridays. All the employees order food, and there is a tea party combined with board games after lunch.

A respondent from Kazakhstan noted that there was extremely important set of communications including compliance with business etiquette, mandatory social "Small-Talk" and regular daily communication; she counts her business "unthinkable" without this set:

"*Early in the morning I open my Instagram story feed, like and comment posts, and I do the same late at night*."

In Kazakhstan, Instagram is very popular and broadly used to maintain such type of communication. Russian respondents noted that their priority is to build long-term (>5 years) and trusting relationships with suppliers and contractors. These relationships are carefully maintained and highly valued, and carefully monitored not to be overshadowed by anything.

3.3. Innovations and technologies

Women business owners in Kazakhstan and Russia showed knowledge of modern digital technologies at a high level. The use of tools such as email, office suites, task schedulers, instant messengers, cloud storage systems and video conferencing is a matter of course.

- All women entrepreneurs that participated in the interviews have a specialized secondary or higher education in technological sphere. Moreover, a small number of women have an additional business education (MBA). Probably that is why modern technologies and innovations do not confuse any of them.
- All respondents believe that the mastering of new knowledge and technologies is a decidedly necessary part of doing business and also an interesting one.
- 2/3 of respondents use cloud CRM systems in their business. There is a conscious and prudent approach to the choice and use of CRM systems, the costs of maintaining the system are measured with the expected benefits (cost/benefit). CRM systems are used to set and control tasks performance, communicate with clients, control and evaluate quality, maintain accounts, integrate with accounting systems.
- 2/3 of respondents use e-commerce systems and fintech technologies such as acquiring and billing in their business.

It is worth noting that all respondents have a very remarkable and prudent approach to the selection and support of IT systems (local network management, setting up and updating office computers, installing and configuring software) used in daily work. Here, the help of family and friends is used with might and main. If a family member is providing assistance, such involvement of an “internal” IT service provider is a matter of course. If someone is involved "from the outside", this is necessarily done on the recommendation of friends or trusted acquaintances.

4. CONCLUSIONS

After conducting a survey and a series of subsequent interviews with women entrepreneurs from Kazakhstan and Russia, we can conclude that the family business is the “primary” family occupation, the relatives of wife or husband do not participate and do not directly help in the doing business. One can also conclude that most frequent role of the “large” family members in the company is support expressed in helping with the housework and children. Another conclusion was that all survey participants had a negative experience of doing business with friends and they consider involvement friends to be a bad practice.

Women entrepreneurs from Russia explained that they are not recipients of state support in any form and are not members of professional organizations. Respondents from Kazakhstan declared their readiness to participate in targeted programs to support SMEs (small and medium-sized enterprises).

Although the assessment of the women entrepreneurs’ stress level was not the objective of the study, all participants of in-depth interviews emphasized the high level of stress while doing business in Kazakhstan and Russia. When asked about the causes of stress, they spoke about the COVID situation and subsequent economic and political uncertainty. These reasons

do not provide possibility to plan a business for any adequate perspective, the planning horizon has become "ultra-short" - a month, a maximum of six months. In addition, uncertainty makes them look for "spare and backup" solutions and the ways to optimize costs and new ways of earning. All survey participants agree that firms with a single product (service), or focused on one sector of the economy, will not survive in the current turbulent world.

Decision-making and personnel management are the strengths of the interviewed women entrepreneurs from Kazakhstan and Russia. Every day they face the tasks of operational management, routine tasks are delegated to employees, and regular internal control procedures are established. Decisions are made thoroughly, but quickly. Close attention is drawn to IT and technical equipment of their business, but always with an eye on the amount of expenses.

In general, one can state that women's family-owned SMEs form competitive advantages based on building a network of mutually beneficial partnerships and networking, well-established quality control methods and compliance with their own obligations, purposeful development of contacts leading to mutually beneficial cooperation. Women business owners showed knowledge of modern digital technologies at a high level, a desire for self-education and improvement of business skills, while clearly demonstrating the ability to negotiate and solve problems through negotiations. At the same time, they retain a pronounced sense of duty to their own family and the priority of children. It prevents family business from weakening because of family disagreements, and therefore is an extremely important sustainability factor. All this makes women highly valuable members of their own or shared family businesses.

REFERENCES

Bakracheva, M., Pavlov, D., Gudkov, A., Diaconescu, A., Kostov, A., Deneva, A., Kume, A., Wójcik-Karpacz, A., Zagorcheva, D., Zhelezova-Mindizova, D., Dedkova, E., Haska, E., Stanimirov, E., Strauti, G., Taucean, I., Jovanović, I., Karpacz, J., Ciurea, J., Rudawska, J., Ivascu, L., Milos, L., Venera, M., Sheresheva, M., Tamasila, M., Veličković, M., Damyanova, S., Demyen, S., Kume, V., & Blazheva, V. (2020). The intergenerational family businesses as a stress management instrument for entrepreneurs (1). The Intergenerational Family Businesses as a Stress Management Instrument for Entrepreneurs. Ruse, Academic Publisher University of Ruse “Angel Kanchev”.

Bruno, E., Frederick, D. S., Gough, D., Long, M., McConnell, D., Padden, J. D., Southard, S., & Winans, N. (2013). Factors Influencing the Growth of Women-Owned Businesses. Prepared for National Women’s Business Council. Public Policy Associates, Incorporated (PPA), SBAH Q-12-M-0206 October 30. Retrieved from: http://publicpolicy.com/wp-content/uploads/2017/04/SBAHQ12M0206-Final-Report_Compliance-Version.pdf.

Buang, N.A., Ganefri, G., & Sidek, S. (2013). Family business succession of SMEs and post-transition business performance. Asian Social Science, 9 (12), 79-92.

Gundry, L. K., Kickul, J. R., Iakovleva, T., & Carsrud, A. L. (2014). Women-owned family businesses in transitional economies: key influences on firm innovativeness and sustainability. Journal of Innovation and Entrepreneurship, 3 (1), 1-17.

Haynes, G., Marshall, M., Lee, Y., Zuiker, V., Jasper, C. R., Sydnor, S., Valdivia, C., Masuo, D., Niehm, L., & Wiatt, R. (2021). Family business research: Reviewing the past, contemplating the future. Journal of Family and Economic Issues, 42, 70-83.

López-Pérez, M. E., Melero-Polo, I., Vázquez-Carrasco, R., & Cambra-Fierro, J. (2018). Sustainability and business outcomes in the context of SMEs: Comparing family firms vs. non-family firms. Sustainability, 10 (11), 4080.

Maxson, M. L. (2019). Women in family businesses. In Women in Changing Japan. Routledge.
Muthathai, P. (2017). Factors influencing the growth of women owned businesses in Kenya (Doctoral dissertation, United States International University-Africa).
Pavlov, D., Sheresheva, M., & Perello, M. (2017). The intergenerational small family enterprises as strategic entities for the future of the european civilization-a point of view. Journal of Entrepreneurship & Innovation, 9 (9), 26-38.
Pavlov, D., Tămășilă, M., Sheresheva, M., & Gudkov, A. (2020). Opportunities to improve the social-economic aspects of the local development by intergenerational family businesses. In Procceedings of the IV International Scientific Conference "Competitiveness and the development of socio-economic systems" dedicated to the memory of Alexander Tatarkin.
Ramadani, V., Memili, E., Palalić, R., & Chang, E. P. (2020). Entrepreneurial family businesses. Springer International Publishing.
Sharma, P., & Nordqvist, M. (2008). A classification scheme for family firms: From family values to effective governance to firm performance. Family values and value creation: The fostering of enduring values within family-owned businesses, 71-101.
Sheresheva, M., Ye, X., & Pavlov, D. (2022). The role of young generations in ensuring Chinese family SMEs Competitiveness. In International May Conference on Strategic Management – IMCSM22, Bor, Serbia. An international serial publication for theory and practice of Management Science, XVIII (1), 331-336.
Shi, H. X., Graves, C., & Barbera, F. (2019). Intergenerational succession and internationalisation strategy of family SMEs: Evidence from China. Long range planning, 52 (4), 101838.
Tan, J. D., Sugiarto, S., & Budhijono, F. (2021). Family Business and Risk Management: Perspectives of SMEs Entrepreneurs in Indonesia. The Journal of Asian Finance, Economics and Business, 8 (5), 851-861.
Ward, J. (2016). Keeping the family business healthy: How to plan for continuing growth, profitability, and family leadership. Springer.
Werner, A., Schröder, C., & Chlosta, S. (2018). Driving factors of innovation in family and non-family SMEs. Small Business Economics, 50 (1), 201-218.
Yedder, M. B. (2018). Human resource management in family business succession: victim or saviour? Journal of Enterprising Culture, 26 (04), 401-421.

Volume XIX, Issue (1) (2023) 39-48

International May Conference on Strategic Management

PREDICTION OF THE CHANGE IN NUMBER OF EMPLOYEES IN SERBIAN COMPANIES BASED ON CONTINGENCY AND QUALITY MANAGEMENT FACTORS

Natalija Perišić*, Vesna Spasojević Brkić, Radiša Jovanović, Ivan Mihajlović, Martina Perišić

University of Belgrade, Faculty of Mechanical Engineering, Serbia

Abstract: A company's development performance and growth may be impacted by a wide range of different factors, which unquestionably affect number of the employees in the loop. Taking into account all influencing factors, companies would benefit if have possibility to predict the degree of change in the number of employees in future period in order to adjust their internal strategy or to make appropriate decisions that enable the survival and progress of the company in the market. The aim of this research is to predict the change in number of employees based on current state of contingency and quality management factors, using information obtained from a survey of 67 different companies from Serbia. In the first part of the research, a correlation analysis is used with the aim to identify the specific contingency and quality management factors that are most closely associated to the subject of interest, which is, in this case, degree of change in the number of employes. The second part of the research involves feedforward neural network training for prediction of the degree of change in number of employees based on feature extraction of main factors. The training accuracy that proposed network achieved is 77.36%, while testing accuracy amounts 71.43%.

Keywords: Correlation analysis, feedforward neural networks, number of employees

1. INTRODUCTION

Risks are involved in almost all activities of a company, so the process of identifying, evaluating and managing risks is an essential component of the strategic development of a company and it has to be planned and designed at the highest level (Dionne, 2013). Risk management represents technique that prioritizes, controls and tracks all risks that may affect a company. Risk management is performed in order to minimize the probability of unfavourable events that can hurt a company or to maximize probability of the realization of positive opportunities (Sahu et al., 2014). There are many risk sources that should be considered in risk identification process. Numerous authors classified sources of risk to make them easier to recognize and track for certain types of industries. Akintoye and MacLeod (1997) categorized risk sources in construction into nine groups, while Ritchie and Brindley (2007) identified seven groups of risk sources in the supply chain although they also mentioned that there are likely myriad other sources of risk that can cause undesirable consequences for a company. A more comprehensive categorization divides risk sources into five groups – production, financial, marketing, human and legal (Crane at al., 2013).

* *Corresponding author: nperisic@mas.bg.ac.rs*

However, in almost every field of industry a potential risk may be caused by human factor and certain analysis have been performed to determine the impact of human factor on experienced accidents, such as in freight train transportation (Zhang at al., 2019), oil and gas industry (Theophilus at al., 2017), construction industry (Garrett & Teizer, 2009), etc.

This paper deals with the prediction of the change in number of employees in Serbian companies based on information about contingency factors and quality management factors obtained from a questionnaire. The proposed approach is very useful for companies to mitigate risks due to the fact that employee turnover has concealed expenses, such as productivity loss, workplace safety problems, and morale harm, and it affects organizational revenue. After reliability analysis, which served for eliminating unreliable data from a survey, correlation analysis method is used for determination of statistical relationship between survey variables in order to extract factors that have impact on the change in number of employees. In continuation, feedforward neural network (FFNN) is trained to predict level of change in number of employees treating this problem as classification task and finally conclusions are given.

2. LITERATURE REVIEW

Nowadays, in order to meet increasing and more sophisticated expectations and demands of the market, companies improve and modernize production processes, equipment, and internal organization. Organizational design is very useful to mitigate risks (Roberts & Libuser, 1993), while there a human capital is a very important asset (Bukowitz et al., 2004; Seclen-Luna et al., 2020). Clearly, number of employees in companies does have an impact on potential risks. As companies grow larger and stronger, the number of employees also increases, which brings with it a greater capacity, but also the possibility of risk exposure. For example, Becker-Blease at al. (2010) investigated a connection between the size of a firm and its profitability, while Meyer et al. (2011) analyse influence of human resources risk management and its impact on companies' performance indicators. In a huge number of works, the number of employees is considered the most important factor for describing the size of the company (Spasojevic Brkic & Mihajlovic, 2023). As an additional criterion, total income or, in rarer cases, income from sales was most often used (MorenoLuzón & Peris, 1998). Further, companies with more employees require more resources, advanced technologies, adequate structural organization, specific expertise, more sophisticated risk management strategies, etc. On the other hand, a decreasing number of employees may lead to lower quality or productivity because the workload increases for the remaining employees who may be dissatisfied with the greater amount of work (Meyer et al., 2011). It is necessary for companies' management to predict the change in number of employees in future period in order to adjust work environment, spot possible risks and prevent them, adapt their strategy on the market and make the most optimal future plans and decisions. Numerous studies in the existing literature attempt to identify important reasons for employee turnover, investigate the relationship between employees' work motivation and turnover, and job success and turnover, but turnover prediction models are not accessible (Prihandinisari et al., 2020). The application of newer, modern methods in management enables a broader range of understanding of the impact of all relevant factors, leading to improved strategies, more optimal decision making and better leadership. One of the techniques that is progressively being applied in practically all areas of industries, professions and work is artificial intelligence (AI). AI is a discipline that deals with the creation of systems that mimic human intelligence. Subset of AI, that uses all approaches that enable machine to learn from available source of data and algorithms, without especially being programmed for certain task is called machine learning (ML). Finally, deep learning (DL) represents subset of ML that includes all computational algorithms and models that emulate the structure and working way of the biological neural networks known as artificial neural networks (ANN). ANN are often used in the field of

human resources. Dutta and Bandyopadhyay (2020) proposed feedforward neural network (FFNN) model for predicting employee attrition which outperformed six other classifiers that were used for comparison with achieved accuracy of 87.01%. Sharma at al. (2022) recognised the problem of increasing work stress level among Indian workers and developed a deep recurrent neural network model for stress detection system for working professionals. In order to predict safe work behaviour in construction project, Patel and Jha (2015) trained FFNN using ten safety climate constructs. Their results showed that absolute percentage deviations for 22 different data samples were in range from 0.03 to 10.15 which is in a permissible range. Some researchers combined various methods and techniques in order to achieve better results and performance of ANN. Anitha and Vanitha (2021) proposed novel technique for prediction of stress for working employees. They used ANN to eliminate unessential attributes from dataset following with the lion optimization algorithm as classifier. This model achieved accuracy of 90.9%. Another method that is often used for prediction and classification problems is by using systems that combine ANN with fuzzy logic and they are called adaptive neuro fuzzy inference systems (ANFIS). Soni at al. (2018) compared ANN and ANFIS for employee turnover prediction in organization, but their research showed that ANN is more optimal solution for that particular problem. ANN combined with analytics hierarchy process (AHP) is also used in risk management which refers to human resources. Yan (2009) investigated employee dismission risk assessment by using mentioned AHP-ANN strategy. Forecasting ratio of demission has ended with absolute value of maximum error 0.0621, while minimum value is 0.0109. Correlation analysis prior to training of ANN was applied by Al-Darraji at al. (2021). Their goal was to extract the most dominant factors for training ANN to predict employee attrition. In three experiments that were conducted, the best achieved accuracy is 94%. They also proved how imbalance in dataset affects ANN performance, as accuracy for imbalanced dataset amounts about 91%.

3. METODOLOGY

This research takes place in two steps. In the first step Spearman's rank correlation coefficient is calculated for determining the strength of relationship between level of change in the number of employees and individual contingency and quality management factors. By using this method, the most crucial factors are identified and taken into consideration in the continuation of research. The second step is training of FFNN model. The input data in model are the main factors selected in the previous step, while the output is degree of change in the number of employees.

3.1. Survey description

The questionnaire used in this study was completed by 67 different companies based in Serbia. Of the total number of companies that participated in the survey, 46.27% are small companies with up to 50 employees, 28,36% are medium companies with a number of employees between 50 and 250, and 25.37% are large companies with more than 250 employees. Also, 10.45% of them are companies established before 1950, 46.27% started in between of 1950 and 2000, and 43,28% are companies founded after 2000. Description of the survey, after reliability analysis, is given in the continuation of the paper.

Group of contingency factors include six subgroups – demographical, environmental, technological, strategical, leadership style and employee behaviour factors, as in Spasojević Brkic (2009). Demographical factors refer to the number of employees, proportion of highly educated employees, percentage of highly qualified employees with long term experience and establishment year of a company. Environmental factors describe the level of heterogeneity (if market and consumer taste vary) and the level of technological sophistication and complexity of the

environment, referring to frequency of introducing new and innovating existing products. Technological factors show automatization level, the use of specialized computer programs and technological level compared to competitor companies. Strategical factors refer to the frequency of innovating process and products, monitoring and reducing costs, the level of efficiency in the use of existing technologies, the importance given to planning and detailed elaboration, the analysis of all main factors when solving problems and frequency of having alternative solutions. Leadership style factors describe the level of proactive thinking of managers, dedication to planning alternative solutions, frequency of motivating and rewarding employees. Finally, employee behaviour factors quantify the extent to which quality is a strategic goal of employees, the desirability level of innovations, the level of proactive thinking in order to prevent potential problems, relationship among employees, atmosphere of cooperation and solidarity, the level of non-formal relationships between employees, employee openness to socialization, rarity of confrontation and presence of team spirit.

Quality management factors are divided in four subgroups, as in Brkić et al. (2016). There are factors of leadership and management support to quality program, factors of training and involvement of employees, process approach factors and quality improvement factors. Factors of leadership and management support to quality program include the degree of taking responsibility for quality and supervision of quality system documents usage by sector directors, the level of long-term vision of company's management for quality improvement, the level of understanding and implementation quality policy by every employee and the level of understanding of quality regulations by employees. Factors of training and involvement of employees include the degree of giving importance to the training and development of employees by management, the frequency of providing financial support for training of employees, giving special importance to employee training for application of quality improvement techniques and methods. Process approach factors define the level of process description and delineation, supervision and improvement of key processes and determination of quality measure for each process in the company. Lastly, quality improvement factors describe the frequency of removing internal processes that result in irrational spend of money and time, the degree of use of information technologies for data analysis and revision of quality system documents and the scope of usage of the methods and techniques for quality improvement. Of the 22 quality improvement methods proposed in the survey, later analysis has shown that only 5 are relevant to this research so only these are mentioned in this paper. Those methods/techniques are flow diagram, network plan, internal audit, sampling and acceptance methods and value analysis.

All mentioned factors are described by using five-point Likert scale except for the demographical factors which are individual for every company. In Table 1 are given demographic factors that are part of the contingency factors, but described differently than other factors.

Table 1. Demographic factors

		Factors
Contingency factors	Demographic factors	Q1: Current number of employees
		Q2: Percentage of highly educated employees
		Q3: Percentage of highly qualified employees with long term experience
		Q4: Year of the establishment of the company

Table 2 lists contingency factors described with Likert scale, their reliability values and descriptive statistics.

Table 2. Descriptive statistics and reliability analysis of contingency factors

		Factors	Mean	Std. Deviation	Cronbach's alpha
Contingency factors	Environmental factors	F1: Environment heterogeneity	3.37	1.301	0.635
		F2: Technological sophistication and complexity	3.36	1.422	
	Technology factors	F3: Degree of automatization	3.55	1.019	0.674
		F4: Usage of specialised computer programs	3.96	1.093	
		F5: Technological level compared to competitors	3.64	0.995	
	Strategical factors	F6: Innovating products and processes	3.52	1.330	0.737
		F7: Supervision and reduction of costs	4.09	1.190	
		F8: Efficiency level using existing technologies	4.01	0.977	
		F9: Given importance to detail planning	3.66	1.188	
		F10: Solving problems by analysing all main factors	3.96	1.134	
	Leadership style factors	F11: Proactive thinking of company manager	3.81	1.328	0.836
		F12: Dedication of planning alternative solutions	3.82	1.167	
		F13: Motivating and rewarding employees	3.69	1.131	
	Employee behaviour factors	F14: Quality is strategic goal of employees	4.34	1.122	0.762
		F15: Desirability level of innovations	4.04	1.134	
		F16: Proactive thinking for problem prevention	3.91	1.097	
		F17: Good relationship between employees	3.76	1.292	
		F18: Cooperation and solidarity atmosphere	3.88	1.200	
		F19: Unformal relationship between employees	3.63	0.935	
		F20: Employee openness to socialization	3.84	0.790	
		F21: Rarity of confrontation between employees	3.84	1.009	
		F22: Presence of team spirit	3.57	1.258	

Table 3 shows quality management factors and their reliability values along with descriptive statistics.

In further analysis, these 44 factors presented in Table 1,2 and 3 are observed as independent variables of the model, influencing one dependent variable – which is the change in the number of employees in the observed companies. The level of change in the number of employees was also quantified but due to the large range of the data, it was logarithmized for the purpose of data normalization and harmonizing the scale with other factors to fit the Likert scale.

3.2. Correlation analysis

In this research Spearman's rank correlation coefficient is calculated in order to determine the strength of relationship between 44 factors, presented in Table 1, 2, and 3 and the level of change in the number of employees. It is the nonparametric rank statistic which measures degree of association between two variables (Hauke and Kossowski, 2011). Spearman's rank corelation coefficient, marked with ρ, can take a value between -1 and 1 and it is calculated using following expression:

$$\rho = 1 - \frac{6\sum di^2}{n(n^2-1)}, \tag{1}$$

Where d_i represents the distance between the ranks of corresponding variables, and n is number of observations. If ρ is equal to zero, it means that there is no relationship between variables, while values 1 and -1 denotes perfect and perfect negative relationship of variables, respectively.

Table 3. Descriptive statistics and reliability analysis of quality management factors

		Factors	Mean	Std. Deviation	Cron. alpha
Quality management factors	Leadership and management support to quality program	F23: Taking responsibility for quality and supervision of usage of quality system documents	4.19	1.004	0.777
		F24: Level of long-term vision for quality improvement	4.16	0.963	
		F25: Company goals and quality policy are understood and implemented by all employees	4.13	1.013	
		F26: Quality regulations are understood by employees	3.88	1.080	
	Training and involvement of employees	F27: Importance attached to training and development of employees by company management	4.06	1.127	0.804
		F28: Frequency of providing financial support for training of employees by company management	3.76	1.195	
		F29: Giving importance to the training of employees for the usage of quality improvement methods	3.63	1.229	
	Process approach factors	F30: Companies processes are precisely described and delimited	3.67	1.307	0.883
		F31: Constantly monitoring and improving key processes	3.94	1.217	
		F32: Determination of quality measure for every process preformation	3.84	1.136	
	Quality improvement factors	F33: Removing internal processes that result in unreasonable spending of money and time	2.88	0.844	0.736
		F34: Usage of advanced information technologies for data analysis	3.61	1.267	
		F35: Revision of quality system documents as necessary	3.54	1.172	
		F36: Range of usage of flow diagram as quality improvement technique	3.69	1.183	
		F37: Range of usage of network plan as quality improvement technique			
		F38: Range of usage of internal audit as quality improvement technique			
		F39: Range of usage of sampling and acceptance methods for quality improvement			
		F40: Range of usage of value analysis as quality improvement technique			

3.3. Feedforward Neural Networks

FFNN represents type of ANN whose architecture is organized into input, hidden and output layers. There can be one or more hidden layers in network model. They are often used for solving regression, clustering, prediction or classification problems.

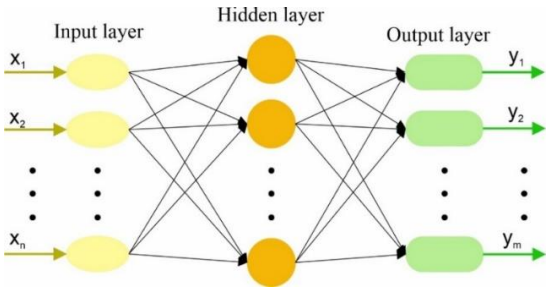


Figure 1. Structure of feedforward neural network

Figure 1. shows structure of FFNN with one hidden layer. In this study, developed FFNN has 18 input data, 6 neurons in hidden layer and 5 neurons in output layer.

Training of neural networks implies adjustment of weight coefficients and biases of neurons. The back propagation (BP) algorithm is one of the most commonly used learning algorithms. It minimizes adopted cost function by recursively adjusting weight coefficient and biases based on gradient descent techniques (Leung and Haykin, 1991). Standard BP algorithm often causes slow convergence to a solution, so faster algorithms based on BP are used. In this research, scaled conjugate gradient BP algorithm (Moller, 1993) is applied. Cost function measures error between predicted output by ANN and desired output. Cross-entropy is used as cost function and it can be presented via:

$$Loss = -\sum_{i=1}^{m} y_i \cdot \log \hat{y}_i, \tag{2}$$

where y_i is desired output, $\hat{y}_i$ is predicted output and m is size of outputs. Activation function of neurons in hidden layer is hyperbolic tangent function, while neurons in output layer use softmax activation function.

4. RESULTS AND DISCUSSION

This section includes results of correlation analysis, which served for neural network training and the results obtained by FFNN.

4.1. Correlation analysis

Figure 2 shows absolute values of Spearman's rank correlation coefficients between every factor Q1-Q4 and F1-F40 and yearly change in the number of employees, which is described via Likert scale where 1 represents decrease and 5 represents increase in number of employees.

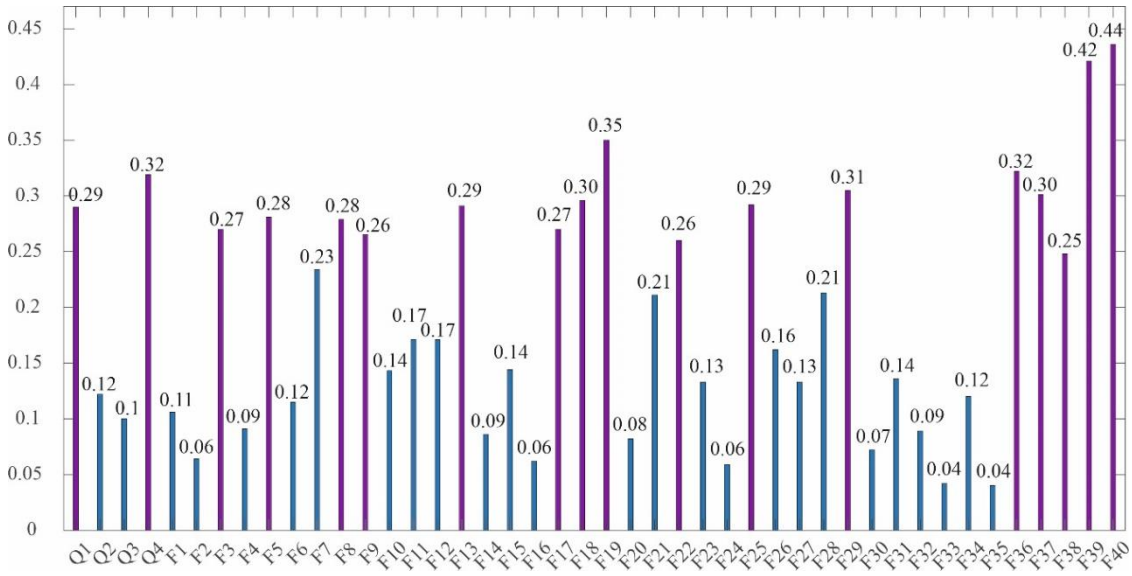


Figure 2. Bar diagram of Spearman's rank correlation coefficient

It is considered that all factors whose coefficient is equal or greater than 0.25 are in correlation with subject of interest. From figure 2 it is clear that main factors are Q1, Q4, F3, F5, F8, F9, F13, F17, F18, F19, F22, F25, F29, F36, F37, F38, F39 and F40, so they are taken in consideration in the second phase of research.

4.2. Feedforward Neural Networks

Inputs in FFNN are 18 selected main factors, while output determines class that our sample belongs to. There are 5 classes, one for every Likert scale value, which explains number of neurons in output layer. From the total of 67 different samples, 80% are used for training, 10% are used for validation and 10% are used for testing our model. The distribution of data in every set is random. In order to prevent overfitting, training of model is interrupted when value of cross-entropy cost function starts to increase in validation process. The minimum value of cross-entropy loss is about 0.22 at 13th epoch. Figure 3 shows the changes in the values of the cost function for train, validation and test set of data during epochs.

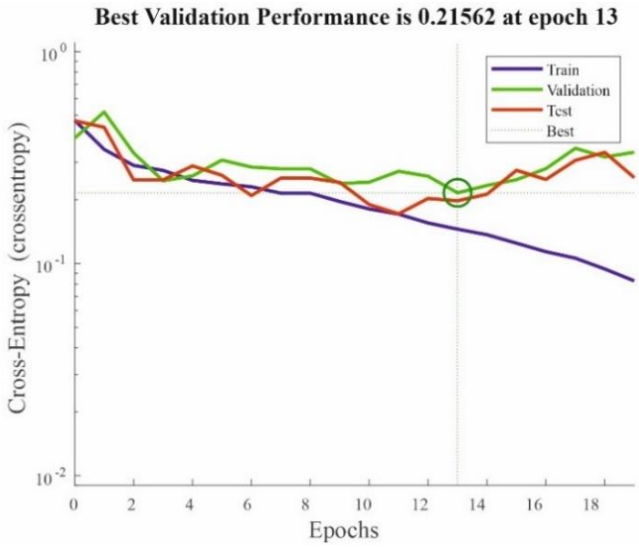


Figure 3. Cross-Entropy loss function

Overall accuracy, precision and recall are calculated as a measure of performance of proposed FFNN model. They are presented in table 4.

Table 4. Accuracy, precision and recall

	Training	Test
Overall accuracy	77.36%	71.43%
Overall precision	73.3%	75%
Overall recall	59.58%	72.23%

5. CONCLUSION

This study deals with the problem of prediction of the change in number of employees in Serbian companies, as it one of the company development factors. Number of employees is important both from human resources management and risk management fields, and according to this survey it could be based on contingency and quality management factors. FFNN model is offered as a solution for this task. In order to achieve the best possible prediction results, survey data are analysed and Spearman's rank correlation coefficients are calculated, resulting with selection of 18 main factors for training of FFNN. Proposed model, which contains degree of automatization, technological level compared to competitors, efficiency level of using existing technologies, given importance to detail planning, motivating and rewarding employees, good relationship between employees, cooperation and solidarity atmosphere, unformal relationship

between employees, presence of team spirit, company goals and quality policy which are understood and implemented by all employees, giving importance to the training of employees for the usage of quality improvement methods, range of usage of flow diagram as quality improvement technique, range of usage of network plan as quality improvement technique, range of usage of internal audit as quality improvement technique, range of usage of sampling and acceptance methods for quality improvement, and range of usage of value analysis as quality improvement technique, achieved accuracy of 77.36% in training and 71.43% in testing. Accordingly, it is recommended to companies to pay special attention in the future to those factors and to use the proposed model. The benefits of this model are in ease of use and implementation and learning is very fast. However, the accuracy of neural network can still be considerably improved. The proposal for the further research is implementing ANN model with different structure, trying other learning algorithm or combining FFNN with other analysing techniques. Also, by expanding of dataset, there would be more samples for learning of neural network, which can positively affect the accuracy.

ACKNOWLEDGEMENT

Results presented in this paper are result of research supported by Ministry of Education, technological development and innovations of the Republic of Serbia under contract 451-03-47/2023-01/ 200105 from 03.02.2023 and by RESMOD SAF€RA project.

REFERENCES

Akintoye, A. S., & MacLeod, M. J. (1997). Risk analysis and management in construction. International Journal of Project Management. 15 (1), 31-38.

Al-Darraji, S., Honi, D. G., Fallucchi, F., Abdulsada, A. I., Giuliano, R., & Abdulmalik, H. A. (2021). Employee Attrition Prediction Using Deep Neural Networks. Computers, 10 (11), 141.

Anitha, S., & Vanitha, M. (2021). Optimal artificial neural network-based data mining technique for stress prediction in working employees. Soft Computing, 25 (17), 11523-11534.

Becker-Blease, J. R., Kaen, F. R., Etebari, A., & Baumann, H. (2010). Employees, firm size and profitability in U. S. manufacturing industries. Investment Management and Financial Innovations, 7 (2), 7-23.

Brkić, V. S., Dondur, N., Klarin, M., & Golubovic, T. S. (2016). Effectiveness of quality management factors and differences in total factor productivity. International Journal of Business Excellence, 9 (3), 293-309.

Bukowitz, W. R., Williams, R. L., & Mactas, E. S. (2004). Human capital measurement. Research-Technology Management, 47 (3), 43-49.

Crane, L., Gantz, G., Isaacs, S., Jose, D., & Sharp, R. (2013). Introduction to Risk Management, Understanding Agricultural Risks: Production, Marketing, Financial, Legal Human. United States of America: Extension Risk Management Education and Risk management Agency.

Dionne, G. (2013). Risk Management: History, Definition, and Critique. Risk management and Insurance Review, 16 (2), 147-166.

Dutta, S., & Bandyopadhyay, S. K. (2020). Employee attrition prediction using neural network cross validation method. International Journal of Commerce and Management Research, 6 (3), 80-85.

Garrett, J. W., & Teizer, J. (2009). Human Factors Analysis Classification System Relating to Human Error Awareness Taxonomy in Construction Safety. Journal of construction Engineering and Management, 135(8), 754-763.

Hauke, J., & Kossowski, T. (2011). Comparison of values of Pearson's and Spearman's correlation coefficients on the same set of data. Quaestiones Geographicae, 30 (2), 87-93.

Leung, H., & Haykin, S. (1991). The complex backpropagation algorithm. IEEE Transactions on signal processing, 39 (9), 2101-2104.

Lijuan, Y. (2009). Employee demission risk assessment based on AHP and BP neural network. 2009 IEEE International Conference on Grey Systems and Intelligent Services (GSIS 2009). IEEE, 1511-1516.

Meyer, M., Roodt, G., & Robbins, M. (2011). Human resources risk management: governing people risks for improved performance: opinion paper. SA Journal of Human Resource Management, 9 (1), 1-12.

Moller, M. F. (1993). A Scaled Conjugate Gradient Algorithm for Fast Supervised Learning. Neural Networks, 6 (4), 525-533.

Moreno‐Luzón, M. D., & Peris, F. J. (1998). Strategic approaches, organizational design and quality management: integration in a fit and contingency model. International journal of quality science, 3 (4), 328-347.

Patel, D. A., & Jha, K. N. (2015). Neural Network Model for the Prediction of Safe Work Behavior in Construction Projects. Journal of Construction Engineering and Management, 141 (1), 04014066.

Prihandinisari, C., Rahman, A., & Hicks, J. (2020). Developing an Explanatory Risk Management Model to Comprehend the Employees' Intention to Leave Public Sector Organization. Journal of Risk and Financial Management, 13 (9), 200.

Ritchie, B., & Brindley, C. (2007). Supply chain risk management and performance: A guiding framework for future development. International Journal of Operations & Production Management. 27 (3), 303-322.

Roberts, K. H., & Libuser, C. (1993). From Bhopal to banking: Organizational design can mitigate risk. Organizational dynamics, 21 (4), 15-26.

Sahu, K., Shree, R., & Kumar, R. (2014). Risk Management Perspective in SDLC. International Journal of Advanced Research in Computer Science and Software Engineering, 4 (3), 1247-1251.

Seclen-Luna, J. P., Opazo-Basáez, M., Narvaiza, L., & Fernández, P. J. M. (2020). Assessing the effects of human capital composition, innovation portfolio and size on manufacturing firm performance. Competitiveness Review: An International Business Journal, 31 (3), 625-644.

Sharma, S. D., Sharma, S., Singh, R., Gehlot, A. Priyadarshi, N., & Twala, B. (2022). Deep Recurrent Neural Network Assisted Stress Detection System for Working Professionals. Applied Sciences, 12 (17), 8678.

Soni, U., Singh, N., Swami, Y., & Deshwal, P. (2018). A comparison study between ANN and ANFIS for the prediction of employee turnover in an organization. 2018 International Conference on Computing, Power and Communication technologies (GUCON). IEEE, 203-206.

Spasojević Brkić, V. (2009). Contingency Theory and Quality Management, University of Belgrade, Belgrade: Faculty of Mech. Eng (in Serbian).

Spasojevic Brkic, V., & Mihajlović, I. (2023). Development of Contingent/Contextual Theory: A State-of-the-Art Review. Tehnika, 78 (1), 77-88.

Theophilus, S. C., Esenowo, V. N., Arewa, A. O., Ifelebuegu, A. O., Nnadi, E. O., & Mbanaso, F. U. (2017). Human factor analysis and classification system for the oil and gas industry (HFACS-OGI). Reliability Engineering and System Safety, 167, 168-176.

Zhang, Z., Turla, T., & Liu, X. (2019). Analysis of human-factor-caused freight train accidents in the United States. Journal of Transportation Safety & Security. 13 (10), 1157-1186.

Volume XIX, Issue (1) (2023) 49-56

International May Conference on Strategic Management

ENTERPRISE RESTRUCTURING FOR COMPETITIVE PERFORMANCE

Andrius Tamošiūnas*

Vilnius Gediminas Technical University, Lithuania

Abstract: The article focuses on the diversity of concepts, approaches and perspectives of enterprise restructuring. Consequently, the author defines that restructuring processes and their management are associated not only with the specifics of enterprise activities in the markets, but also with the coordination of activities with the environment and the enterprise business strategy in the markets. If the environment in which the processes of economic activity take place is uncertain and constantly changing, then the peculiarities of the processes of restructuring enterprises and their management mechanisms are difficult to unify, but regularities are possible. As a result, the conceptual elements of the enterprise restructuring concept have been formed, and evidence of restructuring as a method of developing and implementing an enterprise strategy has been identified. The proposed criteria for evaluating the results of the implementation of enterprise restructuring design and restructuring developments make it possible not only to understand the nature, objectives, scale of the restructuring processes, but also to optimize the enterprise activities, substantially increasing the interaction of the enterprise business components (human and material resources of the company, business partners of the company, consumers) and thereby attain a greater competitiveness of the enterprise.

Keywords: restructuring, strategic management, enterprise, competitiveness.

1. INTRODUCTION

Restructuring processes of enterprises in market economy countries are constantly taking place. It is a natural process fostered by competition, changes in the marketplace, the integration and dynamics of economic systems and processes of globalization, and geostrategic changes.

The processes of restructuring that take place nowadays in the business environment are to a large extent related to the transformation and integration of the economic systems into the global economic landscapes. In the conditions of economic transformation, the goals, opportunities, results of enterprise restructuring relatively much depend on the available possibilities of using material, financial and human resources to attract external resources or optimize the use of internal resources of the enterprise. Optimizing the combination of internal physical and human enterprise and (or) external resources is a challenging task. In a small number of practical examples of this type, enterprise restructuring has been regarded as a success. In the general case, all the vital (main) components of the company's potential become the object of influence of the results of restructuring, therefore, before deciding to restructure the company, it is important to understand the nature of the restructuring of enterprises and the scale of the process.

* *Corresponding author: andrius.tamosiunas@vilniustech.lt*

The scientific problem - much scientific work does not have a systematic approach to enterprise restructuring. The diversity of views on this subject, which predominates in scientific literature, is characterized by incompleteness and contradiction.

The purpose of the paper is the following:

- to form the conceptual elements of the enterprise restructuring concept, which are characteristic of most of the positions cited in the scientific literature;
- to highlight the signs of restructuring as a method of developing and implementing an enterprise's strategy, eliminating, or at least minimizing the differences of opinion prevailing in the scientific literature and allowing a more accurate understanding of the nature, objectives, consequences, and extent of restructuring.

The investigation concerns companies' restructuring processes.

Research methods are a logical comparative analysis of the problem, based on the conclusions and reasoning of the works of scientists from different countries, observation and synthesis of data and research results by the authors, reflecting the processes of restructuring economic entities and markets of different countries.

Scientific novelty and application of research:

- the conceptual elements of the enterprise restructuring concept have been developed,
- the distinctive characteristics of the restructuring methods as a method of developing and implementing the enterprise strategy,
- propose criteria, which make it possible to understand the nature, objectives, scale of consequences of restructuring processes, prerequisites for optimizing the company's activities.

2. THE CONCEPT OF ENTERPRISE RESTRUCTURING

In scientific literature, the concept of restructuring is treated in different ways. There could be found scholars stating that the essence of the restructuring of a company is various actions aimed at increasing the efficiency of its activities by reorganizing its organizational units, i.e., its organizational-administrative structure (Ruiz & Coduras, 2015). Consequently, the restructuring is based on the management of structural units and their interrelationships. Furthermore, during the restructuring of an organization, its individual structural units are combined or distinguished, functions are transferred to other structural units, decentralized or, conversely, centralized. In this regard, as to Kowalska (2015), restructuring is defined as a set of various measures taken with the aim of increasing the competitiveness of an enterprise and, consequently, increasing its value. Close to the latter is the view that a restructuring of a company is a set of measures for the management and transformation of a company, designed to obtain a synergistic effect (Radicic & Petkovic, 2023). Others (Berchicci, 2013; Islam et al., 2023) see the restructuring of organizations as an ongoing complex process carried out to maintain the profitability of the entity in the context of a changing economic environment, technological progress, and competition. While other scholars (Popescu & Ciora, 2015; Voicu et al., 2021) identify restructuring with the totality of the actions for the rationalization of the enterprise activities, when the latter become too diversified or grow to volumes that complicate its management, or the redistribution of assets to increase operational efficiency; decisive for the adaptation of enterprises to the conditions of a market economy.

Based on the above statements, the essence of restructuring can be understood in two ways:

- in terms of tactics for the implementation of the enterprise's operational strategy, namely, when operational efficiency is aimed at reforming the organizational-management structure: the change of individual parts of the structure, the redistribution of operational functions;

- in the strategic sense of the enterprise activities, namely the drawing up of operational development plans or programs subject to the enterprise development strategies, which undoubtedly include the management of both the scale of the activity and its diversification.

Although the authors of the above statements treat restructuring differently, most of the latter nevertheless consider as a restructuring objective an increase in the efficiency of the company's activities through fundamental changes in the company's business strategy. This is perhaps the essential feature that unites the various concepts of restructuring.

By the way, the connection of restructuring with the change in the company's business strategy is also confirmed by insights addressing restructuring as the most important part of a company's transformation processes (Baziki et al., 2017; Burke & Stephens, 2017). Therefore, it can be stated that restructuring is limited to the rationalization of activities due to its diversification or large scale of activities, the redistribution of management functions or changes in the organizational-management structure of the enterprise. Rather, these factors are to be regarded as one of the reasons for the restructuring, but if they lead to a significant reduction in the efficiency of the company's activities or market value and, as a result, to the need to justify the expediency of the existing enterprise's strategy. Otherwise, the problems of diversification and scale of activity can be solved at the tactical level of implementation of the company's operational strategy, but without changing the company's activity strategy in principle.

If defining the restructuring process much more plainly, restructuring can be seen as a fundamental change in the structure of an economic branch (sector), in the organizational-management structure of an enterprise or in the ownership of a company (Hildebrandt et al., 2018; Isaksen et al., 2019). In this regard changes in the structure of the elements of the production, service management system can also be described as restructuring. Consequently when setting the goal of restructuring the following have to be taken into consideration:

- arranging broad agreements for communication and cooperation between industrial enterprises, covering areas from research and technological progress to marketing and distribution, including the rationalization of production, specialization, consumer service;
- the transfer of information about market needs, technological innovations, and achievements (locally and internationally).

In addition, it should be noted that the overall level of the enterprise leadership is also considered to be one of the main factors for achieving performance in a market economy and has a direct impact on the course and results of the enterprise restructuring.

Having in mind the context above from legal perspective enterprise restructuring is can described as change in the type of economic activity, modernization of production, improvement of work organization, sale of the company's assets or part thereof, acceptance of the assets of other companies by merging or dividing them, implementation of technical, economic and organizational measures aimed at restoring the company's solvency, change in the size of the company's obligations to creditors and the deadlines for the execution of the company's obligations to creditors (Law on Insolvency of Legal Entities of the Republic of Lithuania. State Gazette. 2019, No XIII-2221). In this respect Lithuanian law narrows the restructuring of entity to solving its insolvency problems, although in practice the range of cases of restructuring of enterprises is much wider and can be described by the following goals: 1) to adapt to work in the conditions of a market economy and economic integration; 2) create prerequisites for maintaining high profitability indicators; (3) ensure international competitiveness. In addition to this there are also cautious positions: for example, EU legislation does not use the term restructuring – the concepts of measures and methods of

changing the ownership structure of a company are used as a substitute. This is also characteristic of British law, although its researchers tend to call analogous methods reorganization. Consequently, the legal concept of restructuring is associated with the legal regulation of economic activities and property relations between entities, while in terms of the enterprise business strategy, restructuring is perceived subjectively: after all, the strategy of activity is determined by the variety of internal and external economic and social factors of the enterprise. This is also one of the reasons for the contradictions prevailing in the sources examined regarding the definition of the restructuring process, since in each case the need for restructuring the organization and the management of this process is based on the benefits of the company's business strategy, which depend on the relationship between the internal and external economic factors affecting the company and the effectiveness of the use of the company's potential. The contradiction in the definition of the restructuring process is also highlighted by the fact that the management of the restructuring process is characterized by the complex use of the usual measures of the tactical and strategic levels of management of the enterprise.

3. RESTRUCTURING IN THE CONTEXT OF STRATEGIC MANAGEMENT

The appropriateness of consideration to treat the restructuring of an enterprise as a strategy if, for example, restructuring is an ongoing process, as a necessity to respond to changes in the environment can be questioned. In this context, a constant change in the enterprise strategy would lead to problems in the personnel management in terms of the personnel value system and a gap at least from the lowest link in the management of the entity, creating the final product and (or) presenting it to the end user. Consequently, considering that a enterprise strategy is a set of long-term operational objectives, challenges to be solved to achieve them and operational plans to be implemented and given that restructuring is a set of measures and actions to manage fundamental changes in an organization strategy, an enterprise could be described as not having a clear operational strategy. However, having in mind that restructuring is a plan/program for the achievement of the objectives of the change of corporate activities, covering a set of different tools and methods, the identity with the program for the implementation of the company's strategy is clearly visible from the point of view of the content. Therefore, it can be concluded that restructuring is treated as one of the varieties of corporate strategy.

Considering the above context, the restructuring processes from the point of view of strategic management can be identified with the formation and implementation of a particular strategy of the company, since in each case the content of the restructuring process would be based on:

- the company's existing problems (the reasons for the restructuring);
- assessments of the internal and external economic and social factors of the enterprise.
- assessments of the company's internal factors (labor resources, financial resources, production potential);
- the organization’s strategic goals and objectives.

4. VARIATIONS OF ENTERPRISE RESTRUCTURING

The variety of concepts, approaches and opinions of restructuring is also characteristic of attempts to distinguish ways of restructuring organizations and to group them together, drawing on similarities and differences in the characteristics of restructuring processes. For example, it

is argued that, by nature, enterprise restructuring can be twofold, namely: asset restructuring and value restructuring.

The restructuring of assets, as a variant of the restructuring of an enterprise, is characterized by a change in the system of ownership or management, when the ownership relationship is changed by the methods of merger, division, liquidation of the company or parts thereof, formation of other legal forms of company. The implementation of this type of restructuring is based on the following: 1) a reduction in differentiation by eliminating groups of functions (parts of the enterprise structure) that do not correspond to the priorities of its business strategy; 2) diversification, reducing the number of activities of the enterprise that are not important or do not affect the implementation of the company's strategic goals.

Consequently, changes in the enterprise management system are carried out in the following main ways: 1) the exclusion of subsidiaries, branches, independent economic entities to rationalize the use of capital, improving the accounting of the company's activities, the management system. In this case, the assets of the owners of the enterprise remain the same - the management system, certain elements of it, connections and other aspects change; 2) the division of the enterprise by the transfer of management and ownership rights; 3) changing the limits of the limits of responsibility of the company's management bodies.

In this respect, restructuring, using value-creating techniques, is focused on improving the methods and means of developing and managing the enterprise potential in a balanced and sustainable manner.

Mention should be made of the classification of restructuring methods according to the adaptability of enterprises to structural changes in the conditions of a market economy. According to this feature, two types of restructuring can be distinguished: defensive (passive) restructuring and strategic - active (deep) restructuring. Restructuring, where competitiveness is achieved through low costs, without increasing investment in equipment and technology, reducing labor and wages, thereby ensuring the survival of the company or the preservation of its market share, can be considered as passive. Such restructuring is typical for large organizations (Chen et al., 2021). By the way, passive restructuring provides only short-term opportunities for adaptation to market conditions and is most often characteristic of the period of transformation. Meanwhile, deep restructuring focuses on long-term strategic reorganization, covering manufactured products and production processes, development of new products, quality improvement, development and implementation of new business plans, new management research and investments in new technologies. Enterprises increase their share of the local market, penetrating international markets. This way of restructuring is risky but important for international competitiveness. The type of deep restructuring is often applied in enterprises with foreign ownership if considering the context of the local market.

Following the above context, the organizational, legal, financial, and strategic aspects of enterprise restructuring can be considered as well. Respectively the organizational type of restructuring is characterized by the following: 1) the division of production of a horizontal nature (this form of restructuring, especially manifested itself when changing in principle the ownership structure of the enterprise, for instance privatizing or nationalizing enterprises); 2) changes in the internal structure of the enterprise, separating financially non-viable divisions, reorganizing, or liquidating their activities. A common feature of organizational restructuring is the division of large companies into small and medium-sized enterprises.

The main ways of organizational restructuring could be: 1) the division of the company into several independent companies; 2) separation of branches of the enterprise, while maintaining production and property (ownership) relations with the parent enterprise; 3) the separation of part of the assets of the enterprise through the creation of joint ventures; 4) the

provision of full autonomy to individual divisions, while preserving the ownership relationship with the parent company.

The prerequisites for legal restructuring are the possibility of operating enterprises of state and private property, the right of private property, freedom of economic activity and initiative of an individual are legalized at the constitutional level. This method of restructuring is mainly manifested in the transformation of state-owned enterprises into private ones (and (or) nationalizing the latter if there were the legal basis), reorganizing entities from limited liability to public limited entities aiming at business development and growth in terms of scope and scale. Accordingly strategic restructuring is characterized by the diversion of the activities of enterprises to new markets, the promotion of investments aimed at updating fixed capital, assimilating new products, and developing research. And following the context financial restructuring is subject to challenges of corporate debts, highlighting the importance of forecasting and tackling financial risks, while considering the importance of specifics and dynamics of tax system, monetary policy, business environment and its dynamics. In this regard there can be seen that private ownership is often not a reason for restructuring (that is, changes that would allow the entity to survive and thrive in a competitive market). The sale or transfer of ownership rights is not directly related to increasing the efficiency, effectiveness or added value of the enterprise activities, is confirmed by the results of numerous cases of enterprise ownership changes (for instance, in European Union (Epaulard & Zapha, 2022) indicating that partially privatized enterprises perform no worse than fully privatized enterprises and a state-owned enterprise sold to foreign entities work better than those sold to local private operators. As the result transfer of ownership is in principle subject to changing the management of the enterprise activities, but in terms of its business strategy, the latter cannot be a method of increasing the efficiency and effectiveness of the enterprise activities. However, it should be noted that there is also a possible difference of views among the scholars when considering a transfer of ownership as a type of reorganization, while others define the latter as restructuring. The reason for these differences is a different description of the restructuring process, namely, when the subject of restructuring is the change in the organizational-management structure, while other approach is when all actions are associated with the change in the enterprise business strategy, or even – the change in the structure of the enterprise ownership or (and) the change in the owners of the enterprise (Forcadel et al., 2020). However, there is also a transitional approach when a transfer of ownership and restructuring, irrespective of the order in which these processes take place, are necessary both for the efficiency of the business activities and for the growth of enterprise market value (Burke & Stephens, 2017).

The reason for contradiction of scholars' views stated above is that in the scientific literature examined the concept of restructuring – the purpose, causes, management (measures and actions) of restructuring – is not unambiguously defined. For example, when analyzing processes subject to a transfer of ownership it can be noted that the change in ownership of the company's assets (in some places called reorganization) did not increase the efficiency of the company's activities, since the enterprises taken over were not restructured (although it was its employees who became the owners of the enterprises, these are persons who are in principle unrelated to the company's activities, but who hired qualified administrative staff for the management of the company; these are its managers, allegedly experienced and qualified) (Ajavi & Weyman-Jones, 2021). In addition to the latter insight, the cases when the change in the structure of the enterprise ownership or in the structure of ownership of the entities that own the enterprise in question or part of it (i.e., restructuring), do not necessarily result in the market value increase of the enterprise. Still, it can be argued that the market value of the enterprise increased with a significant restructuring of the company before its ownership was changed (Closset et al., 2023).

A change in the structure of an enterprise's own capital or a change in the entities that own a company or part of it is not the subject of restructuring, but one of the possible methods with a temporal perspective and is to be used if it is necessary to accumulate the management potential of the enterprise or to directly manage the latter to modify its business strategy.

4. CONCLUSIONS

Restructuring processes and their management are associated not only with the specifics of enterprise activities in the markets, but also with the coordination of activities with the environment and the enterprise business strategy in the markets. If the environment in which the processes of economic activity take place is uncertain and constantly changing, then the peculiarities of the processes of restructuring enterprises and their management mechanisms are difficult to unify, but regularities are possible.

Restructuring does not replace the strategic management of enterprises but is one of the varieties of strategic management. The preparation and implementation of the restructuring program is based on the requirements, principles, methods of strategic management.

Restructuring is the rationalization of measures for changing the enterprise business strategy, including the interaction of internal resources and experience and actions with the factors and risks of the external environment, to increase the competitiveness of the enterprise activities in a clearly defined time perspective. It is appropriate to design and assess the causes, objectives and consequences of restructuring organizations using the following criteria: market share; financial capacity; operational development potential; marketing quality; enterprise efficiency. Consequently, the author concludes that the main characteristics of restructuring are the following:

- change in the organizational-management system of the enterprise activities (its parts, functions);
- a major modification in the enterprise operating strategy;
- the synergistic effect is expressed in the increase in the market value or operational efficiency of the enterprise (changes in the market value of the enterprise in the short-term and (and) long-term perspective);
- the final result of the restructuring process of the enterprise is identified in a long period of time;
- an action plan(s) with a clear life cycle.

Possible varieties of external (where any independent economic entity becomes the subject or entity of restructuring) and internal restructuring of organizations, the application of which could be based on the specificities of the methods(s) of restructuring enterprise.

In this context, findings of the research may form the basis for further investigations focusing on restructuring organizations affected by divergence of dynamics of business environments.

REFERENCES

Ajayi, V., & Weyman-Jones, T. (2021). State-level electricity generation efficiency: Do restructuring and regulatory institutions matter in the US? Energy Economics, 104, 105650.

Baziki, S. B., Norbäck, P-J., Persson, L., & Tåg, J. (2017). Cross-border acquisitions and restructuring: Multinational enterprises and private equity-firms. European Economic Review, 94, 166-184.

Berchicci, L. (2013). Towards an open R&D system: Internal R&D investment, external knowledge acquisition and innovative performance. Research Policy, 42 (1), 117-127.

Burke, M. J., & Stephens, J. C. (2017). Energy democracy: Goals and policy instruments for sociotechnical transitions. Energy Research & Social Science, 33, 35-48.

Chen, Q., Miller-Hooks, E., & Huang, E. (2023). Assessing transportation infrastructure impacts from supply chain restructuring for increased domestic production of critical resources, Computers & Industrial Engineering, 178, 109116.

Closset, F., Großmann, Ch., Kaserer, Ch., & Urban, D. (2023). Corporate restructuring and creditor power: Evidence from European insolvency law reforms. Journal of Banking & Finance, 149, 106756.

Epaulard, A., & Zapha, Ch. (2022). Bankruptcy costs and the design of preventive restructuring procedures. Journal of Economic Behavior & Organization, 196, 229-250.

Forcadell, F. J., Sanchez-Riofrio, A., Ángel Guerras-Martín, L., & Romero-Jordán, D. (2020). Is the restructuring-performance relationship moderated by the economic cycle and the institutional environment for corporate governance? Journal of Business Research, 110, 397-407.

Hildebrandt, P., Oehmichen, J., Pidun, U., & Wolff, M. (2018). Multiple recipes for success – A configurational examination of business portfolio restructurings. European Management Journal, 36 (3), 381-391.

Isaksen, A., Jakobsen, S-E., & Normann. R. N. (2019). Regional industrial restructuring resulting from individual and system agency. Innovation: The European Journal of Social Science Research, 32(1), 48-65.

Islam, N., Wang, Q., Marinakis, Y., & Walsh, S. (2022). Family enterprise and technological innovation. Journal of Business Research, 147, 208-221.

Kowalska, I. J. (2015). Challenges for long-term industry restructuring in the Upper Silesian Coal Basin: What has Polish coal mining achieved and failed from a twenty-year perspective? Resources Policy, 44, 135-149.

Law on Insolvency of Legal Entities of the Republic of Lithuania. State Gazette. 2019, No XIII-2221. (Lietuvos Respublikos juridinių asmenų nemokumo įstatymas. Valstybės Žinios. 2019, Nr. XIII-2221).

Popescu. D. D., & Ciora, C. (2015). The Second Wave of Restructuring in Romania. A Change of Paradigm. Procedia Economics and Finance, 32, 1289-1304.

Radicic, D., & Petković, S. (2023). Impact of digitalization on technological innovations in small and medium-sized enterprises (SMEs). Technological Forecasting and Social Change, 191, 122474.

Ruiz, J., & Coduras, A. (2015). Can company restructuring create a healthier work environment, promote corporate entrepreneurship, and improve productivity? Journal of Business Research, 68 (7), 1466-1467.

Voicu, D. D., Dumitru, M., & Feleagă, L. (2021). Political interventions in state-owned enterprises: The corporate governance failures of a European airline. Journal of Accounting and Public Policy, 40 (5), 106855.

Volume XIX, Issue (1) (2023) 57-65

International May Conference on Strategic Management

THE IMPACT OF TELEWORKING ON EMPLOYEES AND INNOVATION IN SOLVING CHALLENGES

Sreten Tešanović[1*], Lazo Kukobat[2], Sanja Tešanović[3]

[1]St. Elisabeth University of Health and Social Work, Bratislava, Slovakia; [2]Telefonkabl, Beograd, Serbia; [3]Community Health Center, Ljubljana, Slovenia

Abstract: Emergencies in the world during the Coronavirus pandemic caused physical distancing based on restriction of movement and mutual contact, which directly affected on the population's life and jobs. Both employers and employees have found themselves in a completely new situation. The primary research was conducted in order to gain knowledge and understanding of the challenges of teleworking and its impact on employees by creating more space for application of innovation in solving challenges. The subject of the research is determining and measuring how much teleworking and different types of challenges and innovation affect employees, and to determine the factors of influence of the environment. In accordance with the subject of the research, the research goals are set as follows: to determine the media of communication between the organization and its employees; to determine the necessary skills of employees required for teleworking; to determine the benefits and challenges of teleworking; to determine the impact of teleworking on job security, earnings and additional employee benefits as basic dimensions of job quality.

Keywords: business management, teleworking, communication, employee behavior

1. INTRODUCTION

The impact of teleworking on employees in different economic and non-economic activities, with varying communication preferences and different generations can be seen in the fact that they are becoming more mobile, collaborative, modern and dynamic. Teleworking greatly benefit companies of different sizes because it enables more flexible management of labor productivity. It allowed employees to communicate outside of traditional office spaces, to work in more convenient places, and not to travel to work, but to use information and communication technologies to interact with clients and associates. However, teleworking can also negatively affect employees, and the challenge they face is self-isolation due to a lack of interaction with others. It creates a personal feeling of social isolation and loneliness due to the lack of face-to-face interaction (Busch et al., 2011).

This research focuses on the challenges of teleworking, its impact on employees and managers due to the possible existence of management distrust of teleworking, and the quality of performed work. In developed countries, even before the appearance of the coronavirus, the number of teleworkers has increased. This upward trend has been evident since the 1990s and varies from country to country. The highest percentage of employees that telework is in the UK

[*] *Corresponding author: sreten.tesanovic@yahoo.com*

and Germany, followed by Finland, Sweden, the Netherlands, and France (Korobanicova & Paľová, 2012).

The new circumstances have created different benefits for employees in public and private organizations, despite the difficulties and crisis created by the world's coronavirus pandemic. Many advantages appear when organization's management process and work procedures are well established and when the employees are equipped with appropriate information and telecommunication equipment for working from home. From the aspect of hardware technology of employees and the capacity of managers that are questionable and require deeper analysis, software solutions enable smooth management and implementation of work processes and procedures, as well as holding meetings on distance are widely available.

The advantages of teleworking are especially obvious in reducing stress and promoting well-being for employees. When teleworking, employees do not spend a lot of time in the offices, they are stress-free as they don't have to hurry to work, there is no additional preasurre of having no time to finish particular task or no time to eat. Employee satisfaction is influenced positively and simultaneously by relaxation at home and a longer work presence. On the other hand, the most obvious advantages for organizations and employers are recognized in the modernization of employee work and accelerated digitalization of the process, as well as the rationalization of overhead and material costs of business. However, employees and managers are also facing new barriers in work, such as lack of face-to-face communication, lack of certain documents due to unavailability of colleagues, lack of equipment and office supplies and poor internet connection. Next to these obstacles, there are also various types of personal disturbances when working from home. Purchase of groceries must be done during working hours, care for children and their education as well, and last but not the least – there is a general psychological pressure related to isolation and limited movement because of maintaining of physical distance.

2. LITERATURE REVIEW

Fast and efficient transfer of information in modern business conditions has been enabled by various software solutions and electronic communication networks. Some companies are very active in encouraging teleworking with their employees. So, the Ford Motor Company (colloquially commonly referred to as Ford) and Delta Airlines provide their employees with personal computers for use and work from home (Wasko et al., 2011). There is no universal definition for teleworking and a single term to denote this kind of work (Moon & Stanworth, 1997). In the existing literature and in practical usage, we most frequently come across the terms: work on distance, virtual work, working from home, teleworking and telecommuting. Each of them uses electronic media as a basic tool for job depending on the technology and location that is used. Thus, in addition to working from home, telecommuting can have other forms such as hoteling, hot desking and telework centers (Cascio, 2000). In addition to the above forms, there is another categorization of teleworking jobs. According to the second categorization, there are the following forms of jobs: occasional telecommuting, hoteling, attachment to a certain office, working from home with elements of occasional mobility and completely mobile work on distance (Davenport & Pearlson, 1998).

The Framework Agreement of the European Union defines that teleworking is a form of work or organization of work with the use of information technology within the employment contract, in which work that could be performed on the employer's premises is performed entirely outside those premises. All issues related to liability, equipment and costs must be clearly defined before starting teleworking and in accordance with the existing employment contract.

Emergencies and the overall functioning of the economy during the coronavirus pandemic in the world conditioned the observance of the new measures such as physical distance, restriction of movement and mutual contact that affected the life and work of employees and employers. Besides that, many companies chose to hire for teleworking to attract and retain valuable talent, encourage creativity and innovation, reduce costs, increase productivity and engage employees, and build a more flexible organizational structure that responds better to changes in the environment and in general. That is why it is important to design an organization based on the current situation and the life with the coronavirus, which will function in accordance with the changing environment and even in emergency situation without anxiety and stressful expectations of changes from employees and managers. This is the only way that the expected resistance to change and the fear that flexibility in work is not going to violate the work discipline could be avoided, and that it will not diminish efficiency and effectiveness and certainly the resistance to business control. Besides participation and trust in organization's management, quality communication is of great importance for employees in the processes of change management and resistance to change. Methods for overcoming resistance to changes, in order to ensure a quality work process, are primarily related to education and communication, participation and support of management, negotiation, manipulation and pressure on employees (Kotter & Schlesinger, 2008).

3. RESEARCH METHODOLOGY

In this research paper, the subject of research is to determine and measure how much teleworking and innovations in solving challenges affect employees, and to determine the factors of influence from the environment.

This paper aims to determine which media are the most used in communication between employees and the company; to determine what are the necessary occupations and skills that such an employee should possess; to identify the difficulties, advantages and disadvantages of teleworking that employees face with; to determine the impact of teleworking on the quality of performed work.

The prospective study was conducted in June 2020 on a random sample of 86 persons who worked remotely and performed their duties from home during the coronavirus pandemic, and belonged to different kinds of business, in terms of key variables which were in question. A research instrument in the form of an anonymous survey was used for the implementation itself. The form of the survey questionnaire is designed in a way that, by defining the pages, it is possible to manage the transition to the target pages after certain answer variants, and each unit has a title header within the page. In our case, it was used to divide the answers into categories which contained subcategories. The correlation between the categories was examined by the Hi-square test (χ^2 test), and the collected data were processed by using the statistical program IBM SPSS Version 23. The research results are presented in the text below, and the conclusions were drawn about the impact of teleworking and innovations on employees in resolving the challenges from the environment.

4. RESULTS OF RESEARCH AND DISCUSSION

There is very little research in the field of e-business within the scientific field of business management in Bosnia and Herzegovina and the immediate neighborhood, so this paper will contribute to create a common basis for the future research on teleworking. In this part of the paper, we will present the results of the conducted primary research related to the set goals of the study.

The total sample of 86 respondents consisted of 51% women and 49% men. We divide the sample into two approximately equal age parts, presenting them as the younger and older generation. The younger generation consists of a group of 18- to 40-year-olds or 50,6% of respondents, and the older group consists of 41- to 65-year-olds or 49,4% - illustrated below as Figure 1.

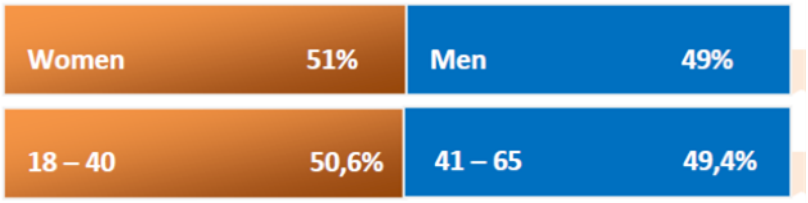


Figure 1. Gender and age of respondents

In order to determine which are the most used media in communication between the organization and its employees when teleworking, and to identify possible challenges, benefits and difficulties when teleworking, we identified important skills of employees necessary for teleworking.

The research results, based on the frequency and percentage of distribution of respondents in terms of communication media used in teleworking in Bosnia and Herzegovina, show that e-mail is the highest-ranked and the most frequently used tool in communication. Telephone conversations and video conferencing share the second place, while telephone messages are in the third place. This is followed by the use of Internet applications for organizing Web meetings. Only 3,5% of respondents said that they had meetings in the company's business premises as the most commonly used medium of communication during teleworking as presented in the Table 1. below.

Table 1. The most frequently used tools

		Rank	Frequency	Percentage	Cumulative percentage
Valid	Email	1	33	38.4	38.4
	Tel. conversation and video conferencing	2	20	23.3	61.6
	Internal net of the company	5	8	9.3	70.9
	E-meetings on the Web	4	13	15.1	86.0
	Office meetings	6	3	3.5	89.5
	Telephone messages	3	9	10.5	100.0
	Total		86	100.0	

The research results related to determining the necessary skills of employees important for teleworking and the set goals of the research were analyzed by the frequency of distribution of respondents as presented in the Table 2. below.

As the most important skill employees should possess when teleworking, the respondents mentioned independence in work and organization of work, which was largely anticipated because they are distant by location and isolated from each other. Second-ranked important skill refers to aligning priorities between business and private life. Balancing responsibilities between business and private life represents the key aspect of teleworking, as employees are

extremely appreciative of the time and money savings that teleworking enables them, so they are more engaged and achieve higher productivity.

Table 2. The most important skills

		Rank	Frequency	Percentage	Cumulative percentage
Valid	Solving of technical problems	4	10	11.6	11.6
	Finding of people and information	7	2	2.3	14.0
	Setting and maintaining of goals	3	16	18.6	32.6
	Independent work and organizing	1	26	30.2	62.8
	Eliminating of disturbances in work	5	6	7.0	69.8
	Cooperation in teleworking	6	4	4.7	74.4
	Balance between business and home responsibilities	2	22	25.6	100.0
	Total		86	100.0	

In third place is adhering and achieving the set of personal goals, followed by the ability of the employee to solve possible technical problems and to independently eliminate all forms of interruption or interference in work. The importance of mutual cooperation of employees and finding people or information when performing daily tasks while teleworking, are considered by respondents as the sixth and the seventh the most important skill of employees.

The research examining the advantages and challenges of teleworking that affects the lives and work of employees is presented in the Table 3. below.

Table 3. Advantages of teleworking – frequency and percentage of distribution of respondents

		Rank	Percentage
Valid	Productivity and job satisfaction	3	65.3
	Balance of work and life	2	72.1
	Perspective job	6	19.4
	Quality of performed work	5	38.8
	Flexible working hours	1	84.9
	Greater responsibility of working time management	4	55.0

Employees highly value time and money savings, flexible working hours and autonomy in executing their work.

Therefore, the key aspect of teleworking is precisely this balance between employees' private and business lives. Teleworkers are essentially more satisfied than their colleagues working on company premises; they are more productive because they can work without

interference and interruptions, which allows them to increase their efficiency and spend more time in continuous work.

By using modern information and communication technologies, employees can communicate effectively with colleagues and superiors, which leads to greater personal satisfaction and job satisfaction, increased initiative, and reduced absenteeism.

All these different forms of teleworking convenience contribute to more efficient and effective execution of work tasks.

The results of the research show that employees, when it comes to the advantages and disadvantages and challenges of teleworking, in terms of frequency and percentage distribution, attach the most importance to more flexible working hours and quality cooperation and communication with the use of modern technological solutions. Modern technological solutions enable them to perform their jobs better, because they can work without interruptions, which ultimately maximizes their working hours, so they spend more time working, so their work is no longer limited to traditional working hours in changing business conditions as presented in the Table 4. below.

Table 4. Challenges of teleworking – frequency and percentage of distribution of respondents

		Rank	Percent
Valid	Searching for information	3	39.3
	Development	6	22.1
	Cooperation and communication with others	1	51.4
	Balance of work and life	4	35.8
	Using of technical solutions	2	42.9
	Organization of personal life	5	30.2

The impact of teleworking on employees, besides those advantages and disadvantages listed above, also has more serious disadvantages that can make negative business effects and that could affect business performance. Before introducing teleworking, the company's management should consider the costs of establishing and maintaining workplaces, consider issues related to the organizational structure and business ethics of the organization, as well as delegating the authority to employees to make business decisions so they could respond to market changes and market demands (Tešanović, 2018). One of the biggest challenges of teleworking is creating a sense of isolation in the lack of interaction and live contact with employed colleagues and managers, as well as lack of trust, organizational change, and a lack of employee focus on work commitments (Cascio, 2000).

When measuring the quality of the work performed, a multidimensional approach is used to determine measures and indicators of its quality. According to Dahl et al. (2009), we can distinguish the following dimensions of job quality: security of employment, earnings and additional benefits for employees, degree of autonomy, chances for advancement and control.

Vital quality dimensions of job quality are job security and earnings. In cases when managers are not able to evaluate and control employees' performance and contribution while teleworking or if they have a negative attitude towards this type of work, employees are afraid of losing their jobs, which is the most important dimension of job insecurity. Earnings or

monetary affiliation to perform a job is a dimension that is inevitably used to measure the quality of the job. The indicator of increasing the quality of work can be measured through the contribution of the employee in increasing the company performance and is manifested by an increase in salaries, while the decrease in earnings is an indicator of decreasing the quality of the work.

During state of emergency, managers with no sufficient experience or skills to assess and control the quality of work performance, may introduce financial compensation that is not appropriate and simply does not match the actual performance of teleworkers. In addition to the salary, economic benefits also include career advancement, while non-economic benefits are based on experience or job satisfaction. These additional benefits relate primarily to the interest and importance of telework, which is primarily challenging and composed of different types of tasks where the ability, skills and self–initiative of employees are directly related to a high degree of job satisfaction and high quality of performed work.

5. CONCLUSION

The primary research was conducted to gain knowledge, understand the challenges and to contribute to the study of teleworking and its impact on employees during an emergency situation in society. The results of the research determine which media are the most often used in communication between employees and the company; what are the necessary occupations and skills that employees should possess; the difficulties, advantages and disadvantages of teleworking that employees are faced with are identified, as well as how the basic dimensions of teleworking affect the quality and safety of work.

In terms of communication media used in teleworking, we can conclude that e-mail is the first and commonly used tool in teleworking. Besides that, information technology and communication technology have additionally contributed to the quality of communication and information transfer between employees who were teleworking and managers who also worked outside their business premises and most often they used phone calls, video conferences, messages and organized video meetings on the Web. Employees who were teleworking in Bosnia and Herzegovina confirmed that they have had complete autonomy and independence in executing and organizing their work tasks, and were able to more successfully balance business priorities and align them with their family responsibilities, all in accordance with their personal time management skills. It is evident that employees highly valuated savings in time and money that teleworking enabled them, so they were more engaged and increased their productivity in performing tasks and achieving organizational goals, because they worked without interruptions and were able to devote more time to solving problems too. This ultimately increased their working hours as they spent more time working. In this manner, work time is no longer limited to statutory working hours, but were adjusted to changing business conditions. For the advantages and challenges of teleworking, in terms of frequency and percentage distribution, the employees emphasize, as the most important feature, more flexible working hours, quality cooperation and communication with the use of modern technological solutions. As common challenges faced by teleworkers, it has been confirmed that these are as follows: finding the necessary information and documents, separating private and business life, need for live interaction in order to influence the basic dimensions of quality and job security as determined in this research, as well as job security and earnings and additional benefits for employees.

REFERENCES

Allen, T. D., Golden, T. D. & Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. Psychological Science in the Public Interest, 16(2), 40-68.

Busch, E., Nash, J., & Bell, B. S. (2011). An examination of emerging issues surrounding remote work, Center for Advanced Human Resource Studies, Cornell University, ILR School, New York.

Cascio, W. F. (2000). Managing a Virtual Workplace. Academy of Management Executive, 14(3), 81-90.

Cassidy, T. (1992). Commuting-related stress: consequences and implications. Employee Counselling Today, Emerald Publishing, 4(2), 15–21.

Dahl, S., Nesheim, T., & Olsen, K. M. (2009). Quality of Work – Concept and Measurement. Working Papers on the Reconciliation of Work and Welfare in Europe (REC-WP 05/2009), RECWOWE Publication, Edinburgh: Dissemination and Dialogue Centre.

Davenport, T. H., & Pearlson, K. (1998). Two Cheers for the Virtual Office. MIT Sloan Management Review, 39(4), 51-65.

Dignan, A. (2019). Brave New Work, e-book, ISBN:9780241361818, Penguin, London, UK.

Felstead, A. (1995). Concepts, Definitions and Estimates of the Extent and Characteristics of Homeworking in Britain", paper presented to the 17th International Working Conference on Labour Market Segmentation, Siena, 18-22 July, Italy.

Freeman, R. (1978). Job satisfaction as an economic variable. The American Economic Review, 68(2), 135–141.

Kelliher, C., & Anderson, D. (2008). For Better or for Worse? An Analysis of how Flexible Working Practices Influence Employees' Perceptions of Job Quality. The International Journal of Human Resource Management, 19(3), 419-431.

Korobanicová, I., & Paľová, D. (2012). Teleworking Trends in Europe, Faculty of Economics, Technical University of Košice, Slovakia.

Kotter, J. P., & Schlesinger, J. A. (2008). Choosing Strategies for Change, Harward Business Review, 130-139.

Larson, B., Vroman, S. & Makarius, E. (2020). A Guide to Managing Your (Newly) Remote Workers, Harvard Business Review.

Moon, C., & Stanworth, C. (1997). Ethical Issues of Teleworking. Business ethics, A European review, 6(1), 35-45.

Narayanan, L., & Plaisent, M. (2017). Telecommuting: The Work Anywhere, Anyplace, Anytime Organization in the 21st Century. Journal of Marketing and Management, 8(2), 47-54.

Nevo, S., Nevo, D., & Kim, H. (2012). From recreational applications to workplace technologies. An empirical study of cross-context IS continuance in the case of virtual worlds. Journal of Information Technology, 27(1), 74-86.

Radivojević, M., Tešanović, S., & Stevnadić, K. (2015). A new concept of personnel management in public administration based on new technological solutions and knowledge basis, Journal of Primary Theory and Practice, Faculty of Law, Banja Luka, Number: 42/2015. (in Serbian).

Spies, M. (2006). Distance between home and workplace as a factor for job satisfaction in the North-West Russian oil industry. Fennia, 184(2), 133–149.

Tešanović, S., & Tešanović, S. (2018). Ethics, University book, University of Business Studies, Banja Luka, ISBN 978-99955-95-11-1, COBISS.RS-ID7412248 (in Serbian).

Association of Employers and Industrial Confederations of Europe, European Association of Crafts and SMEs, European Center of Enterprises in the public sector or of general economic interest and European Trade Union Confederation Framework Teleworking Agreement, accessed at: https://resourcecentre.etuc.org/agreement/framework-agreement-telework.

Wasko, M., Teigland, R., & Leidner, D., & Jarvenpaa, S. (2011). Stepping Into the Internet: New Ventures in Virtual Worlds. MIS Quarterly, 35(3), 645-652.

Volume XIX, Issue (1) (2023) 66-76

International May Conference on Strategic Management

WORKING CAPITAL MANAGEMENT AND PROFITABILITY OF CONSUMER GOODS FIRMS IN NIGERIA

Rafiu Oyesola Salawu[1], Ifeoluwapo Adebimpe Oyewobi[2*]

[1]Obafemi Awolowo University, Ile-Ife, [2]Bingham University, Karu, Nigeria

Abstract: The study examined the effect of working capital management on the profitability of listed consumer goods firms in Nigeria. The Keynesian liquidity preference theory underpinned the study. The total population for the study was thirty-four (24) consumer goods firms listed on the Nigerian stock exchange. The study selected ten (10) sample sizes from the listed consumer goods firms in Nigeria as of 2013–2022, using the purposive sampling technique. Secondary data were obtained from the annual audited financial statements of the sampled firms. The data were analysed using the generalized least squares (GLS) random effect method. The finding revealed that debtors' collection period significantly affect the profitability of Nigeria's listed consumer goods firms. The study concluded that working capital management practices influence the profitability of quoted consumer goods companies in Nigeria. Therefore, the study recommended that managers of consumer goods firms continuously monitor their inventory levels and reduce the debtors' collection period.

Keywords: Consumer Goods Firms, Nigeria, Profitability, Working Capital

1. INTRODUCTION

The working capital management of any firm is an indicator of the firm performance (Jean, 2019). The main aim of any firm is to make a profit; firms are established for no other reason than making and maximizing profit, which indicates that preserving the firm's liquidity is also an important aspect. Increasing profits at the cost of liquidity can greatly harm the firm (Makori & Jagongo, 2013). Therefore, there must be a symbiosis tradeoff relationship between these two basic aims of the organizations. One aim should not be at harm to the other because both have an important role to play in other to boost a firm's productivity.

Financial managers are faced with the major problem of obtaining an optimum level of working capital which is a situation whereby working capital managers can avoid the problem of holding idle funds, which earns no profit for the firm and inadequate working capital, which reduces the firm's profitability as well as production interruptions and inefficiencies (Jean, 2019). Working capital management is most important to consumer goods firms in developing economies because they are faced with many problems such as; low investment, low sales, lack of resources, low level of product and process technology, small market, lack of access to capital, lack of physical infrastructure, production capacity to satisfy demand (because they are small), thereby, making inventory management more crucial (Toby, 2014). Most studies (Altaf & Shah, 2017; Jean, 2019; Sorin & Anca, 2021) have examined the effect of working capital management on the profitability of firms for a shorter period, normally for

[*] *Corresponding author: ifeoyewobi@gmail.com*

5 to 6 years. Thus, the study examined the effect of working capital management on the profitability of consumer goods firms in Nigeria for considerably longer period. Thus, the study was guided by formulating the following null hypotheses:

$H0_1$: The inventory conversion period has no significant effect on the profitability of consumer goods firms in Nigeria.

$H0_2$: Debtors' collection period has no significant effect on the profitability of consumer goods firms in Nigeria.

$H0_3$: Creditors' payment period has no significant effect on the profitability of consumer goods firms in Nigeria.

2. LITERATURE REVIEW

2.1. Conceptual Framework

2.1.1. Working Capital Management

Working Capital Management encompasses current assets and current liabilities. It involves the management of current assets and liabilities directly in proportion to the liquidity and profitability of the company (Altaf & Shah, 2017; Charitou et al., 2012). The current liquidity crisis has reflected the impact of working capital management. Working capital management has showcased the impact on profitability through the company's liquidity. To reach good working capital management, firm managers should accurately control the tradeoff between profitability maximization and liquidity (Rahman & Mohamed, 2007). The best or the optimal point of working capital management is expected to have a significant and positive value to the firm (Deloof, 2003; Afza & Nazir, 2007). Working Capital Management is a crucial and sensitive organ in financial management (Tanaveer et al., 2016). It involves deciding the amount and financing of these assets and depicting the organization's running. Current assets involve all those assets that, in the normal spectrum of business, return to the form of cash within a short period, within a year and such temporary investment as may be converted into cash as soon as possible. In managing a firm, an asset-liability mismatch may come up, which leads to an increase in profitability in the short run but indicate a serious liquidity challenge.

2.1.2. Inventory Conversion Period

The inventory conversion period (ICP) is used as a proxy for inventory management. The ICP is one of the partial components of the cash conversion cycle and, by extension, the working capital management. Inventories include supplies, finished goods, work-in-progress and raw materials. These inventory categories are essential to virtually all business operations (Brigham & Houston, 2007). Raw materials are materials and components that are inputs in making the final product. Work-in-progress refers to goods in the intermediate stages of production, while finished goods are final products ready for sale (Moles et al., 2011). Efficient inventory management ensures stable working capital, which ultimately increases profitability. Businesses must always strive to maintain an optimum level of inventory (Lazaridris & Tryfonidis, 2006). It is worth noting that two aspects relating to inventory efficiency are vital, one to know the size of the inventory order, and the second to know the level at which the order should be placed. This decision is mostly handled using an important model called the Economic Ordering Quantity (EOQ) model. This model is an empirically

based formula or structure embodied by certain theoretical assumptions to balance sales, fixed costs, carrying costs and total costs.

2.1.3. Debtors' Collection Period

The debtors' collection period (DCP) is the time a firm takes to collect or receive payment from debtors or customers. The debtors' collection period measures the average number of days a business takes to collect payment for credit sales (Mekonen, 2011). Most companies allow customers to buy goods and pay later, typically within 30 days. These types of accounts are considered to account receivables and assets owned by the business. Trade receivable account is the timeframe in which accounts receivables are expected to be returned from the respective debtors. The accounts receivable at a firm represent the total unpaid credit it has extended to its customers. The receivable account can include trade credit (for example, credit extended to other businesses) or consumer credit (credit extended to a consumer) or both (Moles et al., 2011). The business provides trade and consumer credit because doing so increases sales and is often a competitive necessity to match the credit terms offered by competitors. However, the downside to granting such credit is that evaluating customers' credit applications is expensive to ensure they are creditworthy and monitor their ongoing credit performances. Firms that are not diligent in managing their credit operation can suffer large losses from bad debts, especially during a recession, when customers may have trouble paying their bills. An important parameter in the receivable account is the credit policy variable.

2.1.4. Creditors' Payment Period

The creditors' Payment Period refers to a firm's time to pay its suppliers or creditor. The creditor Payment Period is used to proxy credit payment days, which means how long it takes a firm to pay its creditors to keep the business relationship intact (Tanaveer et al., 2016). It is computed as the average account creditor divided by the cost of sales multiplied by 365 days. The expected relationship is that creditors' payment days should positively affect the firm's profitability. It is because an increase in creditors' payment period tends to afford firms more days to reinvest.

2.1.5. Profitability

A firm has several objectives but "profit maximization" is paramount (Afza & Nazir, 2007). Because profit maximization has inherent limitations, some would rather substitute it with 'wealth maximization. Nevertheless, profit is a tool for efficient allocation because it is the most appropriate measure of an organization's performance under competitive market conditions (Dapo &Teju, 2017). Conceptually profit connotes the excess revenue a firm generates over its associated cost for an accounting period. Operationally, the term profit could be more precise, as many variants exist. The term profit could refer to profit before tax, profit after tax, gross profit, net profit, profit per share, and return on assets, among other variants (Dapo &Teju, 2017). This imprecision has often posed decisional challenges to researchers who must select an appropriate variant to proxy profitability. Profitability is a hallmark for measuring the efficiency of any organization; final proof of efficiency is not seen as the extent of profitability cannot be taken as a. Many other factors besides efficiency influence profitability (Shrivastava et al., 2017). The most commonly used variant as an appropriate measure of profitability includes gross operating profit (GOP), net operating

profit (NOP) and return on assets (ROA) (Deloof, 2003; Lazaridis & Tryfonidis, 2006; Rahman & Nasr, 2007).

2.1.6. Return on Asset (ROA)

Return on Assets (ROA) is defined as one of the components of profitability ratios in the financial statements that provide how much a company can generate from its asset (Shrivastava, et al., 2017). This ratio is most often discussed because it is an indication of company success to in making profits. ROA is an index to measure the company's ability to generate profits in the past and present, which will be used to project for the future. Assets are overall company properties realized itself, or a foreign direct investment converted into company assets used for sustainability. The metric is commonly expressed as a percentage using a company's net income and average assets. A higher ROA of a company's performance will increase efficiency and productivity in managing its financial statement. It is a positive sign for investors to invest in the company stock, leading to increased company stock in the capital market. While a lower ROA indicates, there is room for improvement.

2.2. Empirical Review

Adegbola et al. (2022) studied the impact of working capital management on the profitability of selected quoted agricultural and agro-allied companies (from 2012 to 2016) in Nigeria. Secondary data were extracted from audited accounts of eighteen quoted agricultural and agro-allied companies in Nigeria, four of which are agricultural companies out of the twenty-three in Nigeria. Descriptive research design and regression analysis were used. Working capital management was measured using the trade receivables collection period, trade payables, payment period, inventory turnover period, and cash conversion cycle, while profit before interest and tax measured profitability. The study found that working capital management and profitability are related to Nigeria's agriculture and agro-allied sector. The result shows that the trade receivables collection period and profitability are negatively related. The finding shows that the trade payables payment period, inventory turnover period, inventory turnover period, cash conversion cycle and profitability are positively related. The conclusion is that working capital management and profitability are related. All four proxies for working capital (i.e. TRCP, TPPP, ITP and CCC) are significantly related to profitability (proxy by PBIT). The study recommended that the managers ensure efficient and effective management of the CCC and other components that formed the CCC: the trade receivable collection period, trade payables payment period and the inventory turnover period.

Oladimeji and Aladejebi (2020) analyzed the impact of working capital management on the profitability of SMEs in Nigeria. This study used secondary data from the selected SMEs' five-year annual reports, 2014-2018. The regression analysis method was adopted. The account Collection Period, Inventory Conversion Period, Average Payment Period, Cash Conversion Cycle, Debt Ratio, Current Ratio, and Quick ratio was used to measure the independent variable, and Return on Assets was used to measure the dependent variable. In conclusion, the study revealed no relation between working capital management and SME profitability. Thus the recommendation is that the Nigerian government policy should be geared towards enhancing the growth of SMEs and that SMEs should adopt prudent working capital policies and measures aimed at improving strategies should be directed towards enhancing SMEs' growth.

Olaoye et al. (2019) examined working capital management and firms' profitability in Nigeria quoted firms on Nigerian Stock Exchange (NSE). A panel data methodology was

used with different regression estimators to analyse this relationship based on a balanced panel of 10 listed firms from 2008-2017. It was discovered that the cash collection period and payment period negatively impacted the return on assets. However, the impact was only significant for the cash payment period on the ground of −0.064 ($p = 0.000 < 0.05$), as against the estimate for the cash collection period that stood at −0.032 ($p = 0.077 > 0.05$). Also, it was discovered that the current ratio and inventory period positively impacted the return on assets. However, the impact was only significant for the current ratio on the ground of 8.172 ($p = 0.000 < 0.05$), as against the estimate for the inventory period that stood at 0.045 ($p = 0.438 > 0.05$). The study concluded that working capital management affected firms' profitability in Nigeria. Therefore, it was recommended that while the shorter collection was maintained, payment to creditors should not be elongated to enjoy cash discounts (if any) and that firms should be proactive in the management of raw materials in order to avoid idle resources that might negatively impact their financial performance.

Lung'aho and Omagwa (2018) investigated the effects and efficiency of working capital management strategies in Indian fast-moving consumer goods (FMCG) firms. The author used secondary data for 2013–2017, collected from 15 listed FMCG firms. The dependent variables are return on investment (ROI), ROA, and equity (ROE). In contrast, the independent variables are the current ratio, quick ratio, debt-equity ratio, gross profit ratio, net profit ratio, inventory turnover ratio, debtor's turnover ratio, fixed assets turnover ratio, total assets turnover ratio, working capital turnover ratio, dividend payout ratio, cash conversion cycle, and firm size. The study's finding is that there is a significant positive and negative relationship between profitability and working capital management. In conclusion, efficient management of working capital for FMCG companies has a positive relationship with profitability and significantly impacts such firms' profitability.

2.3. Theoretical Review

2.3.1. Keynesian Liquidity Preference Theory

Keynesian liquidity preference theory discusses working capital management. This theory was propounded by lord Keynes (1936). According to him, the theory seeks to explain the interest rate level regarding two important factors desire for money and the desire of savers to hold their savings in cash or near cash. Keynes defines this theory as the reward of not hoarding but the reward for parting with liquidity for a specific period. The theory argues that when all things are constant, investors prefer investments to illiquid ones and will always demand a premium for investments with a maturity period. According to this theory, people hold cash or inventory for these motives: for transaction, speculative, precautionary, and compensation motives. The need for working capital to run day-to-day business activities is an indispensable obligation. Firms need to make enough funds available for current assets to enhance their business activities' successful running (Abuzayed, 2012).

The Keynesian liquidity preference theory underpinned the study. Schilling (1996) argued that due to the business environment's uncertainty, firms need to maintain a minimum liquidity requirement to provide financial flexibility. The liquidity preference theory of interest is a theory of money that explains the monetary nature of interest rates. Keynes explained that liquid preference influences the interest rate. The saving decision. He believed that money or liquidity is necessary for economic activity in monetary production economic compared to savings.

3. METHODOLOGY

This study employed a longitudinal research design since the study depends mainly on secondary quantitative data. This method is appropriate because it aids in assessing the relationship between related variables in a panel data environment. The total population for this study includes thirty-four (24) consumer goods firms list on the Nigeria exchange group (see appendix section). The study selected ten (10) sample sizes from the listed consumer goods firms in Nigeria as of 2012-2022, using purposive sampling technique. This period is considered vital to have fairly and up-to-date available data. All the ten listed consumer goods firms selected as sample for the study were considered because their financial statement covers a period from 2012-2022. This study used secondary data from annual reports and audited accounts of the sample Consumer goods firms in Nigeria. Pool ordinary least square regression is used to analyze the effect of working capital management on the profitability of consumer goods firms in Nigeria. The method's effectiveness forms the choice of ordinary least square regression in testing the relationship among related variables and estimating the effect of variables on the other. The study conducted diagnostic tests like Breush-Pagan- Godfrey to deal with the effects of serial correlation, multi-collinearity, Heteroskedasticity and Hausman specification to choose the appropriate model for the study.

Model Specification

$$\boldsymbol{ROAit = \beta 01ICPit + \beta 2DCPit + \beta CPPit + \mu i} \quad \textbf{(i)}$$

Where;

ROA = Return on Asset of the firm I at time t
β0 = Constant term (intercept);
ICP = Inventory Conversion Period
CPP = Creditors' Payment Period
DCP = Debtors' Collection Period
μ_{it} = error term.

A priori expectation: $\beta_1, \beta_2, \beta_3 > 0$

4. RESULTS

4.1. Descriptive Statistics

Table 1. Descriptive Statistics Authors' Computation, (2023)

Variables	Obs	Mean	Std. Dev.	Min	Max
ROA	100	0.1051	0.1991471	-0.2	1
ICP	100	79.6358	48.62921	-88.31	237.82
DCP	100	139.6166	282.7586	2.54	2107.08
CPP	100	220.4151	400.1714	-220.3	3416.55

Table 1 presents the descriptive statistics for the study's dependent and explanatory variables. N denotes the number of panel observations. Therefore, the number of panel observations is 100. The return on assets (ROA) reflects a mean of ₦ 0.11 and a standard deviation of ₦, 0.10, while -0.20 and ₦1 are the minimum and maximum values, respectively. The standard deviation reveals that the data of ROA are not far spread across the mean of the data; this implies that the ROA of consumer goods firms in Nigeria is closely

around the mean. The minimal dispersion between the maximum and minimum further confirms this. Thus, the ROA of consumer goods firms is related from one company to another.

4.2. Correlation Analysis

Table 2. Correlation Matrix Authors' Computation, (2023)

Variables	ROA	ICP	DCP	CPP
ROA	1.0000			
ICP	0.0418	1.0000		
DCP	0.5528	0.1305	1.0000	
CPP	0.3358	0.3697	0.4484	1.0000

Table 2 revealed that no relationship among the explanatory variables is large enough (greater than 0.7) to pose the problem of serial correlations among the data. Furthermore, the table reveals a positive correlation coefficient between the inventory conversion period (ICP) and return on assets (0.0418) of listed consumer goods companies in Nigeria during the period under study. The debt conversion period (DCP) is positively associated with the return on assets of listed consumer goods companies (p-value = 0.5528). Finally, the creditor's payment period (CPP) is positively associated with the return on assets of listed consumer goods companies, given a p-value of 0.3358. The positive relationships between ICP, DCP, CPP and the return on assets of listed consumer goods companies in Nigeria imply that they are associated with increased profitability.

4.3. Regression Analysis

Table 3. Summary of GLS Random Effect Regression Results Authors' Computation, (2023),

ROA	Beta Coef	Z-values	P > /Z/
ICP	-.0003072	-0.83	0.408
DCP	.0003522***	5.31	0.000
CPP	.0000693	1.38	0.166
Constant	.0651118	2.00	0.046
R^2		0.3201	
Wald chi^2 (4)		45.19	
Prob > chi^2		0.0000	

**** 1% Level of Significant*

Table 3 presents the results of the random effects model. The Wald Chi^2 of 45.19, which is significant at 1% (0.0000), reveals that the model is well-fitted. In comparison, the coefficient of determination R^2 of 32.01% explains the variation of the dependent variable (ROA) as a result of the changes in the independent variables (Inventory Conversion Period (ICP), Creditors Payment Period (CPP) and Debtors' Collection Period (DCP)). Thus. an R^2 value of 32.01% indicates that the independent variables account for 32.01% of the total variation in the dependent variable. In comparison, the remaining 67.99% (i.e. 100-32.01) of the variation could be explained by other factors not considered in this model. This result could be interpreted to mean that Inventory Conversion Period (ICP), Creditors' Payment Period (CPP), and Debtors' Collection Period (DCP) are not responsive to return on assets (ROA). That is why it accounts very low for its variation.

4.4. Test of Hypothesis

4.4.1. Test of Research Hypothesis One

Ho_1: Inventory conversion period has no significant effect on profitability of listed consumer goods firms in Nigeria.

Given that inventory conversion period has a p-value of 0.408 (see table 3) which lies above the 5% accepted level of significance; the study therefore accepts the null hypothesis and conclude that inventory conversion period (ICP) has no significant effect on return on asset of listed consumer goods firms in Nigeria.

4.4.2. Test of Research Hypothesis Two

$H0_2$: Debtors' collection period does not significantly affect the return on assets of listed consumer Goods firms in Nigeria.

Given that the account receivable period has an estimated p-value of 0.000 (see table 3), which lies below the 5% accepted level of significance, the study, therefore, rejects the null hypothesis and concludes that the debtor's collection period (DCP) has a significant effect on return on asset of listed Consumer Goods firms in Nigeria.

4.4.3 Test of Research Hypothesis Three

Ho_3: Creditor payment period' has no significant effect on return on asset of listed consumer goods firms in Nigeria.

Given that the Creditor payment period' has an estimated p-value of 0.1666 (see table 3), which lies above the 5% accepted level of significance, the study, therefore, accepts the null hypothesis and concludes that the Creditor payment period (CPP) has no significant effect on return on asset of listed Consumer Goods firms in Nigeria.

4.5. Discussion of Findings

The first objective of this study was to examine the extent to which the inventory conversion period influences the profitability of listed consumer goods firms. The finding from this study revealed an insignificant impact of inventory conversion periods on the return on assets of listed consumer goods firms in Nigeria. The result is consistent with the study that sought to assess the effect of working capital management on the profitability of listed construction and allied firms (Lung'aho & Omagwa, 2018). They found a negative and weak correlation between inventory holding periods with return on assets. However, the finding is inconsistent with the finding which examined the effect of working capital management on the profitability of quoted bottling companies in Nigeria and found that inventory turnover days have a positive and strong impact on the profitability of quoted bottling companies in Nigeria (Idris & Yahaya, 2018). Findings from this study concerning the test of the second hypothesis, which seeks to examine the extent to which debtors' period influences the return on assets of listed consumer goods firms, revealed that DCP significantly affects the return on assets of listed consumer goods firms in Nigeria. The finding disagrees with the study that found that the trade receivables collection period and return on the asset are negatively related (Adegbola et al., 2022). The finding is, however, consistent with the study that examined the

effect of working capital management on the profitability of quoted bottling companies in Nigeria for the period 2001-2014 and found account receivables to have a significant effect on the profitability of quoted bottling companies in Nigeria (Idris & Yahaya, 2018). In the test of the third hypothesis of the study, which seeks to investigate the extent to which creditors' payment period influences the return on assets of listed consumer goods firms in Nigeria; findings revealed that creditors' payment period (CPP) has an insignificant effect on the return on asset of listed consumer goods firms in Nigeria. The finding is consistent with the study which found that trade payables inventory turnover period and profitability are positively related (Adegbola et al., (2022).

5. CONCLUSION AND RECOMMENDATIONS

In line with this study's findings, the study concludes that working capital management practices influence the profitability of quoted consumer goods companies in Nigeria. However, in specific terms, the debtor's conversion period significantly affects the return on assets of listed consumer goods firms. In contrast, the inventory conversion period and creditor's payment period exert an insignificant effect on the return on assets of listed consumer goods firms in Nigeria. In line with the study findings, the following recommendations become imperative.

Managers of consumer goods firms in Nigeria should continuously monitor their inventory levels to reduce the number of days inventory is held in store before they are sold. It will enhance their profitability and liquidity positions.

Listed consumer goods firms in Nigeria should re-negotiate with their regular and important debtors to increase the day's accounts due for settling debtors.

Finally, the accounts payable, regarded as a major source of working capital financing for firms, should be improved to enhance the cash conversion cycle from negative status.

REFERENCES

Abuzayed, B. (2012). Working capital management practices and firm performance in emerging markets: The case of Jordan. International Journal of Managerial Finance, 8(2), 155-179.

Adegbola, J. K., Mamud, H., & Felix, D. O. (2022). Impact of working capital management on the profitability of selected quoted agricultural and agro-allied companies (from 2012 to 2016) in Nigeria, Journal of Applied Sciences, 2(1), 65-83.

Afza, T., & Nazir, M. S. (2007). Impact of aggressive working capital management policy on firms' profitability. IUP Journal of Applied Finance, 15(8), 19-30.

Altaf, N., & Shah, F.A. (2017). How does working capital management affect the profitability of Indian companies? Journal of Advances in Management Research, 15(3), 347–366. https:// doi.org/10.1108/JAMR-06-2017-0076

Brigham, F., & Houston J. Fundamentals of Financial Management. Thomson Learning Academic Resource Center, 11th Edition. 2007

Charitou, M. S., Elfani, M., & Lois, P. (2012). The effect of WCM on firm's profitability: empirical evidence from an emerging market. Journal of Business and Economics Research, 8(12), 63–68.

Dapo, N. P., & Teju, O.O. (2017). The impact of working capital management on performance and profitability of manufacturing firms. Journal of Business Finance and Entrepreneurship, 2(1), 38-49.

Deloof, M. (2003). Does working capital management affect the profitability of Belgian firms? Journal of Business Finance & Accounting, 30(3-4), 573-588.

Idris. M., & Yahaya, M. (2018). Effect of working capital management on profitability of quoted bottling companies in Nigeria. International journal of economics, commerce and management, 5(6), 402-417.

Jean, B. N. (2019). Impact of Working Capital Management Practices on Profitability in State-Owned Enterprises Management, 9(2), 37-47.

Lazaridis, J., & Ryfonidis, D. (2006). Relationship between working capital management and profitability of listed companies in the Athens stock exchange. Journal of Financial Management and Analysis, 19, 26-38.

Lung'aho, C., & Omagwa, J. (2018). Working capital management and profitability of manufacturing firms listed under construction and allied sector at Nariobi. Securities exchange Kenya, International journal of scientific and education research, 2(4), 43–63.

Makori, D. M., & Jagongo, A. (2013). Working capital management and firm profitability: Empirical evidence from manufacturing and construction firms listed on Nairobi Securities Exchange, Kenya. International Journal of Accounting and Taxation, 1(1), 1–14.

Mekonen. K. (2013). working capital management and profitability; Evidence from Ghanaian listed manufacturing firms. Journal of economics and international finance, 5(9), 373

Moles, S., & Garcia-Teruel, P., & Martinez-Solano, P. (2010). Working capital management in SMEs,.Accounting and finance Journal, 50(3), 511-527.

Moussa, A. A. (2018). The impact of working capital management on firms' performance and value: Evidence from Egypt. Journal of Asset Management, 19(5), 259–273.

Oladimeji, J. A., & Aladejebi, O. (2020). The Impact of Working Capital Management on Profitability: Evidence from Selected Small Businesses in Nigeria. Journal of Small Business and Entrepreneurship Development, 8(1), 27-40.

Olaoye, F., Adekanbi, J., & Oluwadare, O. (2019). Working capital management and firms' profitability: Evidence from Quoted firms on the Nigeria stock exchange. Intelligent information management, 11 (1), 43-60.

Rahman, A., & Mohammed, N. (2007). WCM and profitability – case of Pakistani firms, International Review of Business Research, 3(1), 279–300.

Schilling, G. (1996).Working capital roles in maintaining corporate liquidity. TMA journal, 16(5), 4–7.

Shrivastava, A., Nitin, K., & Purnendu, K. (2017). Bayesian analysis of working capital management on corporate profitability: Evidence from India. Journal of Economic Studies, 44(2), 568–584.

Sorin, G. A., & Anca, E. A. N. (2021). The Impact of Working Capital Management on Firm Profitability: Empirical Evidence from the Polish Listed Firms. Journal of Risk and Financial, 8(1), 2-21.

Tanaveer, B., Mohammed, I.N., Mohammed, A.K., & Mohammed, A.K. (2016). The impact of working capital management on firms' financial performance: Evidence from Pakistan. International Journal of Economics and Financial Issues, 6(3), 1097-1105.

Toby, A. (2014). Working capital management policy and corporate profitability of Nigerian quoted companies: A sectoral analysis. International Journal of Financial Management, 3(1), 9–20.

APPENDICES

```
. su roa icp dcp cpp
```

Variable	Obs	Mean	Std. Dev.	Min	Max
roa	100	.1051	.1991471	-.2	1
icp	100	79.6358	48.62921	-88.31	237.82
dcp	100	139.6166	282.7586	2.54	2107.08
cpp	100	220.4151	400.1714	-220.3	3416.55

```
. pwcorr roa icp dcp cpp
```

	roa	icp	dcp	cpp
roa	1.0000			
icp	0.0418	1.0000		
dcp	0.5528	0.1305	1.0000	
cpp	0.3358	0.3697	0.4484	1.0000

```
Random-effects GLS regression                   Number of obs     =       100
Group variable: id                              Number of groups  =        10

R-sq:                                           Obs per group:
     within  = 0.2521                                         min =        10
     between = 0.6880                                         avg =      10.0
     overall = 0.3201                                         max =        10

                                                Wald chi2(3)      =     45.19
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0000
```

roa	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
icp	-.0003072	.0003713	-0.83	0.408	-.0010349	.0004205
dcp	.0003522	.0000664	5.31	0.000	.0002221	.0004823
cpp	.0000693	.00005	1.38	0.166	-.0000288	.0001674
_cons	.0651118	.0326372	2.00	0.046	.001144	.1290796
sigma_u	0					
sigma_e	.16788868					
rho	0	(fraction of variance due to u_i)				

Volume XIX, Issue (1) (2023) 77-87

International May Conference on Strategic Management

SUCCESSOR CHOICE PRACTICES IN INDIAN SMALL AND MEDIUM ENTERPRISES

Sudhir K. Jain[1*], Nalin Jain[2]

[1]Department of Management Studies, Indian Institute of Technology Delhi, New Delhi;
[2]International Management Institute, New Delhi – 110016 (INDIA)

Abstract: Family-Owned Business Enterprises are world's most common form of economic organizations. LaPorta et al. (1999) found that 45% of the publicly listed international firms are family owned. FOBEs comprise 80% to 90% of all business enterprises in North America and contribute about 57% of the GDP (Astrachan & Shanker, 2003). One-third of all companies in the S&P 500 index and 40% of the 250 largest companies in France and Germany are family owned. In contrast to large enterprises, the Small and Medium Enterprises (SMEs) are more owner-centric and continue to operate successfully under the founder-owner's control. Afterwards, the future of SMEs largely depends on their successor's skills, competence, attitude, maturity, wisdom etc. Thus, the choice of successor in SMEs remains a crucial issue. The problem faced by SME owners usually remains more intense in the developing countries and traditional patrilineal societies, particularly when the enterprise owners do not have son/s or have only one son who is either not interested in the family business or is not suitable otherwise. In such situations, the choice of successor of SME poses a great challenge with the potential risk of its closer. This paper presents successor choice practices among Indian SME owners.

Keywords: family-business succession, business succession practices

1. INTRODUCTION

Family-Owned Business Enterprises (FOBEs) have dominated industrial ownership throughout the world (Colli, 2002; Morck & Steier, 2005). Their importance got marginally diluted with the emergence of modern corporation perceived to be more efficient form of firms through their professional style of management. However, in the new millennium, the merits of the FOBEs have been started to be re-evaluated in serious studies (Gomez-Mejia et al., 2001; Schulze et al., 2001). FOBEs are the world's most common form of economic organizations. LaPorta et al. (1999) found that 45% of the publicly listed international firms are family owned. In North America, FOBEs comprise 80% to 90% of all business enterprises and contribute about 57% to the GDP (Astrachan & Shanker, 2003).

Most of the national governments across the world extend major support to Small and Medium Enterprises (SMEs) because of their significant contribution to the economy. In India, almost all micro, small and medium enterprises (MSMEs) are FOBEs (Sharma, 2000) and contribute to employment, GDP and foreign exchange earnings to a great extent. Many SMEs last upto the life of their founders. The most important reason why the successor/s fail

* *Corresponding author: skjain@dms.iitd.ac.in*

to run the SME successfully is the founder's lack of understanding of the importance of succession planning. Thus, it is pertinent to investigate different dimensions of succession in SMEs. One important dimension of succession is understanding the pattern of successor choice practices. This paper attempts to analyse this aspect among Indian SME owners.

2. LITERATURE REVIEW

Family businesses can be very diverse in their size and type: very small (micro or tiny), small, medium or large; ownership may be proprietorship, partnership, private limited or public limited (unlisted or listed). Internationally, the overwhelming majority of family businesses are micro, small or medium sized (Gersick et al., 1997; Hume, 1999; Bjuggren & Sund, 2000). According to European Commission's Directorate-General for Enterprise & Industry (2009) too, not just a large majority of European family companies are SMEs but most European SMEs (especially micro and small enterprises) are family businesses. This is true for almost all of the micro and small business enterprises and many medium enterprises from around the world as they are started by the individual entrepreneurs and run with family help and participation. As prevalent in the literature, 'family businesses' and 'SMEs' are used synonymously. In India, FOBEs are not recognized as separate entities, unlike the MSMEs which receive specific focus by the government and come under the purview of the Ministry of MSMEs. According to the Annual Report (2022-23) of the Ministry of MSMEs (Govt. of India, 2023), out of 62.39 mn MSMEs, 19.67 mn, i.e. 31.5% of the total, are in manufacturing sector whereas 43.7 mn are in trading and other services sector. Most of these MSMEs (> 90%) are under proprietary ownership. Ghemawat & Khanna (1996) found that organizations that are family owned or controlled conduct roughly 60% of all business activities in India.

The periodic Global Entrepreneurship Monitor (GEM) Reports have indicated that in most of the participating nations (61 in 2022 study), the Total Entrepreneurial Activity (TEA) rates have shown an upward trend, with the exception of pandemic years in several countries.

Although the SMEs contribute significantly to the economic and social well-being in most of the countries, their lack of longevity continues to remain a cause of concern the world over. Ward (1987) in a life expectancy study of 200 manufacturing FOBEs found that only 3 out of 10 survived into a second generation and only 16% of all FOBEs made it to the third generation. Beckhard et al. (1983) found that the life expectancy of a FOBE was 24 years. Many subsequent studies estimated that internationally only 30% of FOBEs survive to the second generation, while fewer than 14% make it beyond the third generation (Fleming, 1997; Matthews et al., 1999; Bjuggren & Sund, 2001). Smaller FOBEs, i.e. SMEs are especially vulnerable to business succession (Perricone et al., 2001). One of the main reasons for the high failure rate among first and second generation FOBEs is their inability to manage the complex and highly emotional process of ownership and management succession to the next generation (Magretta, 1998; Matthews et al., 1999). At least 30% of the closures of FOBEs are due to failure in transition of the business from one generation owner to another (European Federation of Accountants & Auditors, 2000; Le Breton-Miller et al., 2004). Shah (2012) found that one of the causes of closer of SMEs in India is that the second or next generation of the founders do not want to join their family businesses due to their interest in other lucrative careers or family feud. Thus, it is imperative to study the business succession processes and practices and then to research on intervention strategies to reduce the SME closers.

3. BUSINESS SUCCESSION PROCESS IN FOBEs

Business succession in FOBEs has three distinct phases of succession. The succession activities and events of these phases are shown in Figure 1.

3.1. Pre-entry phase

The act of planning for retirement and business succession includes identifying the stages and activities involved in the succession process and the time for their completion, listing criteria for selection of appropriate successor and the methods to be adopted for their grooming. It also includes selecting the successor/s and intimating all stakeholders of the choice. In literature these activities and events are treated as part of the main business succession activity referred to as 'business succession planning'. The planning of succession directly affects the quality of the succession process and involvement of the family members has to be sought in the process (Ward, 1987; Davis, 1997; Sharma et al., 2000, 2001). The pre-entry phase also includes initiating and implementing the pre-entry grooming and development activities of the successor/s such as education, partial involvement in the FOBE and work experience outside and inside the FOBE.

3.2. Post-entry phase

The entry of the successor/s in the FOBE starts with the active involvement (normally construed as full time involvement) where the successor/s are trained on different functions and departments in the FOBE. The successor/s are also associated with the incumbent to learn the functions and responsibilities of the incumbent. These are all parts of the grooming process and preparation for taking over the management leadership. The 'grooming for takeover' is a gradual process and may require many years and may include exposure to all types of jobs in the enterprise and sometimes some jobs outside (Ward, 1990; Handler, 1992). Thus, it should ideally begin much in advance of transfer of leadership role and ownership. The integration of the successor/s in the business is an important activity to be accomplished before moving to the next phase of business succession process.

3.3. Transfer phase

The transfer phase is more crucial and starts with the incumbent beginning to reduce active involvement in the FOBE, either due to age or ill-health or other reason, and the successor/s taking over the activities and responsibilities of the management leadership. This is to be followed by the successor/s taking over the complete responsibilities of the FOBE from the incumbent and sometimes the exit of the entrepreneur from the FOBE altogether. The business succession process is often not as smooth as it may be thought of. If there are two sons of the incumbent, the usual practice followed in India is to name the elder son as the successor. However, lack of meticulous planning has been found to lead to family feud. This is the likely scenario when either the younger brother (or sister) is more ambitious or jealous of elder sibling or has past inbuilt animosity for whatever reason or some vested interest relative or person sows the seeds of hostility among the siblings. These findings are largely based on in-depth interviews of the SME owner family members. Whenever the rivalry crosses the threshold and no amicable settlement is reached, the SME gets closed temporarily or permanently, and the rival factions seek legal recourse or intervention of a mutually acceptable arbitrator.

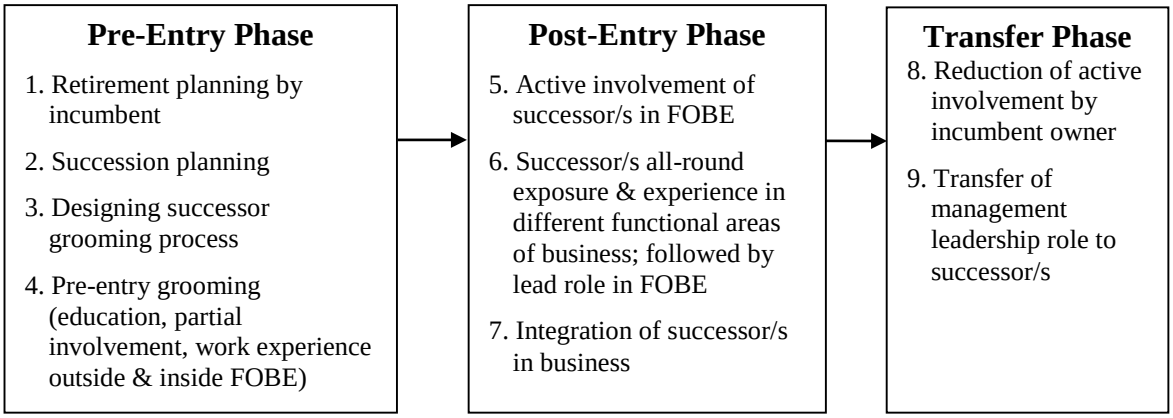


Figure 1. Phases and Activities of the Business Succession Process (Partially adapted from: Longnecker & Schoen, 1978; Handler, 1992; Stavrou, 1999)

4. SUCCESSION PRACTICES

Due to the patriarchal system prevailing in most parts of India, it is observed that son/s are chosen as successor/s due to the prevalent system of daughters' relocation to husband's place after marriage. If there is only one son, succession choice is usually obvious. But if there are two or more sons, the total business activity and family assets are amicable evenly distributed among the sons, and at times, daughters too. In case of SMEs in India, if a business enterprise owner does not have a son, one practice is to sell off the enterprise or close it down at the time the owner is unable to operate it due to old age or ill-health. Another prevalent practice is to choose a successor from among the children of a sibling or close relative. However, in such cases, the probable successor is identified at a much earlier stage under consultation and advice of elderly family members and other well-wishers, and the grooming process starts well in time for ensuring business success. In recent times, daughters have also started taking over as successor/s or demanding their share of the parental assets which is valid as per prevailing law in India. The major challenges faced by SME owners in India as found in our study are:

4.1. Sons non-suitability or disinterest in family business

In our study, some SME owners have been found facing a major challenge when their son/s are not considered suitable for taking up SME responsibilities, or have other questionable interests or bad habits or may lack prudence or capability or have strained relations with parents. Shah (2012) also found that many times the sons do not consider continuing with the family business as the first choice. It is likely that the son/s even though moderately qualified, may not be interested in taking up small family business and may prefer some other more attractive occupational activity with lesser responsibility. In such situation, the SME gets closed down.

4.2. Education of son/s vs. size of SME

When SME owners have a smaller enterprise and son/s are academically bright and excel professionally through qualifying from top rated universities, the family business enterprise ceases to be attractive enough to them for work. The over-qualification poses a major challenge and becomes a disincentive for son/s to join the family business. Even if the

son/s join the family business on parental persuasion, the conflict of functioning style poses a challenge. Our study has revealed subsequent separation of common business in such cases.

4.3. Age difference between father and son

With the increasing longevity, a challenge or conflict has been found when the SME owner decides to continue his total control over the business up to the age of 70 or 80 and, in the process, the son starts feeling frustrated due to not having his say in the business decisions. The situation gets worse when son/s decide to separate out form family business. Thus, the age difference between the father and son/s plays an important role in the smooth succession among SMEs. Apparently, a higher age-gap between father-son/s would lead to quicker, smoother and successful succession as by the time the son/s become ready to take on the leadership responsibility to succeed, the father would be nearing his retirement. However, the higher age difference has also been found to lead to generational and communication gap among them.

5. RESEARCH METHODOLOGY

This study is based on the sample responses received from 374 SME owners selected through snowballing process from Delhi state and neighbouring districts of other states in the Delhi Nation Capital Region (NCR). These SME owners responded to a structured questionnaire. The questions sought responses on a 5-point Likert scale in different ways: "Least" to "Most" or otherwise. The sample mean for responses to different questions have been found. The t-test and One-Way ANOVA have been used for statistical analysis for testing if the differences in the sub-samples' mean are significantly different. Respondent SME owners were asked to indicate the extent of prevalence of a successor choice practice among their fraternity on a scale of 1-5, as follows: 1: least prevalent, 2: less prevalent, 3: moderately prevalent, 4: quite prevalent and 5: most prevalent. The mean of the respondent-scores on prevalence practice are determined and compared to the mid-scale value of 3 (moderately prevalent) for statistical significance using sample t-test for determining whether the practice is more or less than moderately prevalent. The respondents are divided in groups based on a variable and the mean of the respondent scores on extent of prevalence for a group is compared with mean of all other groups for statistically significant differences among them. This is done using the independent sample t-test or One-Way ANOVA, as applicable. The means of the groups are examined for finding out if the same are statistically significant.

6. RESULTS AND ANALYSIS: SUCCESSOR SELECTION PRACTICES

The most important decision in the succession planning process is the selection of the successor. The selection of successor/s may or may not be based on the capability of the successor to successfully run the FOBE as well as acceptability by all stakeholders, especially within the family, if there are more contenders. However, in SMEs the succession process is more smooth, barring some exceptions. Researchers have noted many prevalent and customary practices guiding successor-selection (Stavrou, 1999). In India, if there is only one son, he is the successor of the SME by default irrespective of his suitability and his willingness to be the business successor. The extent of prevalence of this practice needs to be studied. However, if there are two or more sons of SME owner and all of them are involved in the family business, the traditional practice is similar to many other Asian region FOBEs to choose the eldest son as the successor (Alcorn, 1982; Barnes 1988). Joint working of all

successors in one enterprise generally poses major challenge due to dissimilar capabilities, attitude, aptitude, strengths and weaknesses of joint successors. In such situations, the SME owners tend to set up independent enterprises for each one of them. This works well in India due to rapidly growing markets and expansion of cities as well as rural-urban migration trend. Among the present succession concerns of the Indian SME owners, an important one is the unwillingness of potential successor/s to take over the SME (Shah, 2012). If the potential successor is unwilling to be the successor, or no member from the family is found suitable or capable to be successor, one of the practices that some owners follow is to make a relative (who may not be from the immediate family) as the successor. This is a practice followed in other Asian FOBEs (Hambata, 1991; Kuratko et al., 1993). The most obvious option in case no successor is found from the family is to sell off the business, but Indian owners are not too inclined to choose this option.

Even though successor selection should be only based on the criteria of capability, personality and willingness to lead the MSM-FOBE, more often than not, this is done under certain constraints, most of which are either from the family or from traditional societal norms. It has been established that successor selections in FOBEs are mostly from within the family (Kirby & Lee, 1996; Cromie et al., 1999). The first preference of SME owners is to find the successor from their progeny even if none of their progeny have the above qualities. Within the family, gender and birth order preferences are almost always prevalent (Alcorn, 1982; Keating & Little, 1997). During successor selection, family needs and traditional prevalence often become more important than business interests. The extent of prevalence of these traditional successor choice practices from within the family among Indian SME owners is discussed.

According to almost all owners interviewed in the exploratory study, if there is only one son of the SME owner, he is looked upon as the successor right from his time of birth. Irrespective of his temperament, capabilities and willingness to take over the lead role, he is conditioned from childhood to look at the SME as his only and ultimate career destination. The findings on the extent of prevalence of choosing only son as successor among Indian SME owners are presented in Table 1. The practice has a mean scores of 4.53 on prevalence, which is significantly higher than mid-scale value of 3 ($t = 32.45$, $p = 0.00$). Thus, the prevalence of choosing only son as successor is between ‘quite prevalent’ and ‘most prevalent’ among Indian SME owners which is in line with findings of various other studies (Alcorn, 1982; Martin, 2001; Tatoglu, 2008). This finding also concurs with findings of Trow (1961) on UK SMEs.

Table 1. Survey Findings on Practice of Choosing Son as Business Successor

Choosing Only Son as Business Successor Extent of Prevalence Variable for Comparison (criteria for forming groups for comparison) Test used for comparing group means		Mean	SD	*P* Value	*t* Value	Significant Pairs (*)	F Value between Groups	Extent of Prevalence/ Significant Differences
Extent of Prevalence (N=364) (Mean compared to scale mid-value of 3) One Sample t-Test		4.53	0.90	0.00	32.45**	NA	NA	Quite Prevalent-Most Prevalent
(a) Sector of Enterprise (Manufacturing; Service/Trading) Independent Sample t-Test	Manufacturing (N = 196)	4.68	0.63	0.00	3.65**	NA	NA	Manufacturing >Service/ Trading
	Services/ Trading (N=168)	4.35	1.11					
(b) Manpower(E1=Up To 5; E2=6-10; E3 = 11-25; E4 >25) Duncan's Mean Test	E1(N = 89)	4.35	0.98	NA	NA	E4vs E1	2.33*	E4>E1
	E2 (N = 86)	4.62	0.86					
	E3 (N = 103)	4.49	0.87					
	E4 (N = 86)	4.67	0.86					
(c) Managerial-role Manpower (M1=0; M2=1; M3=2-4; M4=≥5) Duncan's Mean Test	M1(N=88)	4.36	0.96	NA	NA	-	1.42 *(NS)*	No Significant Differences Found
	M2(N=121)	4.61	0.84					
	M3(N=88)	4.53	0.84					
	M4 (N= 67)	4.58	0.97					
(d) Education Level of Owner-Manager (Y1=School; Y2 = Graduation; Y3=Post-Graduation and Higher/ Professional) Duncan's Mean Test	Y1(N = 93)	4.57	0.71	NA	NA	Y2vsY3	4.14*	Y3>Y2
	Y2 (N = 155)	4.38	1.08					
	Y3(N = 116)	4.69	0.72					
(e) Inheritance Status (Inherited; Self-established) Independent Sample t-Test	Inherited (N=107)	4.63	0.75	0.18	1.36 *(NS)*	NA	NA	No Significant Differences Found
	Self-established (N=257)	4.49	0.95					

** *Significant at 0.01 level;* * *Significant at 0.05 level; NS: Not Significant*

6.1. Sector of enterprise and choosing son as successor

The extent of the prevalence of choosing only son as successor is compared between manufacturing SME and service/trading SME owners. Table 1 shows that the mean of respondent-scores for prevalence of choosing only son as successor for manufacturing SME owners is 4.68, significantly higher than 4.35, the mean of respondent-scores for the prevalence among service/trading SME owners ($t = 3.65$, $p = 0.00$). Possible justification lies in the nature of SME as the manufacturing is a more extensive and hard activity than service/trading and requires a male successor who can more easily adjust to the shift timings and safety is not so much an issue on gender ground. The son might have got well-groomed in the production processes of the manufacturing SME at an earlier stage during partial involvement in the business.

6.2. SME size by manpower and choosing son as successor

The prevalence of choosing only son as successor is compared among SME owner groups formed on the size of the enterprise measured by manpower employed. The results,

shown in Table 1, indicate mean of group E4 (4.67), is more than mean of group E1 (4.35), and F-value is 2.33 which is significant at 0.05 level. The prevalence of choosing son as successor is significantly higher among owners of large SMEs with manpower of more than 25 employees than among owners of small SMEs (with manpower of up to 5). This finding supports the sound logic that larger SMEs would give financially more attractive future to the son and with further scope for expansion of the SME.

6.3. Managerial-role manpower and choosing son as successor

The extent of prevalence of choosing son as successor among SME owners is compared across SMEs with different managerial-role manpower. The results are presented in Table 1. The means of the groups M1 (4.36), M2 (4.61), M3 (4.53) and M4 (4.58) do not show any significant differences when compared with each other (F=1.42). This establishes that the prevalence of choosing son as successor, does not vary with the managerial-role manpower in the SME. The managerial-role manpower is an indicator of the availability of the outside managerial resource in the SME. This finding reflects that the son is not only chosen just because he will augment the managerial resource for the SME but is looked on as managerial resource that is unique in its commitment to the enterprise.

6.4. Education level of SME owner and choosing son as successor

The SME owners interviewed in the exploratory study opined that their higher education level could seemingly influence consideration of the capability and suitability as also the willingness of the son to take over the business before nominating him as successor. To verify this, the prevalence of ‘son as successor’ is compared across SME owners segmented by their education level. The results presented in Table 1 show that the mean of group Y2 (4.38) is significantly lower than the mean of group Y3 (4.69). The F value being 4.14 is statistically significant. Contrary to the opinion of the owners in the exploratory study, the prevalence of choosing son as successor among Indian SME owners, does not decrease with their higher education level. Owners with post-graduation and higher/professional education level are more inclined to select only son as successor as compared to owners with only graduation level education. Seemingly, the post-graduation or higher/professional education owners realize the effectiveness of son who is expected to jointly continue to expand the enterprise size.

6.5. Inheritance status and choosing son as successor

The mean score on prevalence of ‘son as successor’ is also compared for group of owners who inherited the SME and those who were the founders of the SME. The results (Table 1) show that the group of respondents who inherited the SME, have a mean score as 4.63 as compared to a mean score of 4.49 for the group of SME founders. The difference in the means is not found to be significant ($t = 1.36$, $p = 0.176$). The extent of prevalence of choosing son as successor, is not influenced by the inheritance status of the incumbent SME owners. This result finds justification in similar choice of son as the SME successor, irrespective of their inheritance status of their SME.

7. CONCLUSION

The analysis of prevalent practices of successor selection have been discussed in this paper. In Indian SMEs, the practice of choosing son as successor is most prevalent. In the situation of successor not being available from the family, the practice of choosing a relative from outside the family as successor is 'less' to 'moderately' prevalent whereas selling off the business is 'moderately' prevalent.

Excluding the practice of choosing the eldest son as successor and selling off the business when no successor is available from the family, all other three successor selection practices are higher in prevalence among manufacturing SME owners than among service SME owners. The sector of business activity is a variable that influences the current successor selection practices in Indian SMEs.

The successor choice practices vary partially with the SME size measured by manpower employed. The prevalence of choosing son as successor is more among SME owners with post-graduation or higher education level than among owners with lesser education level. None of the other three successor choice practices vary with education level of the SME owners.

The prevalence of successor choice practice does not vary with the inheritance status of the SME owners in India. The in-depth interviews have revealed that Indian MSM owners follow the practice of dividing the ownership of the SME among all sons while the practice of dividing the ownership among all sons and daughters is just moderately prevalent.

The empirical results and analysis presented here provide us good knowledge about prevalent practices of succession in Indian SMEs.

REFERENCES

Alcorn, P. (1982). Success and survival in the family-owned business. New York: McGraw-Hill.

Astrachan, J. H., & Shanker, M. C. (2003). Family businesses' contribution to the U.S. economy: a closer look. Family Business Review, 16(3), 211-219.

Barnes, L. B. (1988). Incongruent hierarchies: daughters and younger sons as company CEOs. Family Business Review, 1(1), 9-21.

Beckhard, R., Dyer, W., & Gibb Jr. (1983). Managing continuity in family owned business. Organizational Dynamics, 12(1), 5-12.

Bjuggren, P. O., & Sund, L. O. (2000). Organization of successions of small and medium sized enterprises within the family. Presented at the Proceedings of the International Council for Small Business, (CD-Rom) 45th World Conference. Brisbane, Australia.

Bjuggren, P. O., & Sund, L. O. (2001). Strategic decision making in intergenerational successions of small and medium-size family-owned businesses. Family Business Review, 14(11), 11-23.

Colli, A. (2002). The History of Family Business, 1850–2000. Cambridge: Cambridge University Press.

Cromie, S., Adams, J., Dunn, B., & Reid, R. (1999). Family firms in Scotland and Northern Ireland: An empirical investigation. Journal of Small Business and Enterprise Development, 6(3), 253-266.

Davis, P. (1997). Clarify your objectives before you begin. In M. Fischetti, (Ed.), The Family Business Succession Handbook, (pp. 5-7). Family Business Publishing Company, Philadelphia, PA.

European Commission, Directorate-General for Enterprise and Industry. (2009). Final report of the expert group: Overview of family–business–relevant issues: Research, networks, policy measures and existing studies, p.11.

European Federation of Accountants & Auditors. (2000). Keeping it in the family – SME family business succession.

Fleming, P. D. (1997, May). Case study—helping business owners prepare for the future. Journal of Accountancy, 46–47.

GEM Global Report (2011). The Global Entrepreneurship Monitor. Retrieved May, 8, 2012 from:http://www.babson.edu/academics/centers/blank-center/global research/gem/pages/ reports.aspx

Gersick, K. E., Davis, J. A., Hampton, M. M., & Lansberg, I. (1997). Generation to generation—Lifecycles of the family business. Boston, MA: Harvard Business School Press.

Ghemawat, P., & Khanna, T. (1996). The future of India's business groups: an analytical perspective. Paper presented at the Academy of Management National Meetings. Cincinnati, Ohio.

Gomez-Mejia, L. R., Nunez-Nickel, M., & Guiterriez, I. (2001). The role of family ties in agency contracts. Academy of Management Journal, 44, 81–95.

Govt. of India. (2023). Ministry of MSMEs: Annual Report.

Hambata, M. (1991). Crested kimono: Power and love in the Japanese business family. New York: Cornell University Press.

Handler, W. C. (1992). The succession experience of the next generation. Family Business Review, 5(3), 283-307.

Handler, W. C. (1994), Succession in family business: a review of the research. Family Business Review, 7(2), 133-157.

Keating, N. C., & Little, H. M. (1997). Choosing the successor in New Zealand family farms. Family Business Review, 10(2), 157–171.

Kirby, D. A., & Lee, T. J. (1996). Research note: succession management in family firms in north east of England. Family Business Review, 9(1), 75-85.

Kuratko**,** D. F., Hornsby, J. S., & Montagno, R. V. (1993). Family business succession in Korean and U.S. firms. Journal of Small Business Management, 31(2), 132-136.

LaPorta, R., Lopez-de-Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. Journal of Finance, 54, 471-517.

Le Breton-Miller, I., Miller, D., & Steier, L. P. (2004). Towards an integrative model of effective FOB succession. Entrepreneurship Theory and Practice, 28(4), 305-328.

Longenecker, Justin G., Schoen, John E. (1978). Journal of Small Business Management, 16(3)

Magretta, J. (1998, January/February). Governing the family-owned enterprise: an interview with Finland's Krister Ahlström. Harvard Business Review, 113–123.

Mathews, C. H., Moore, T. W., & Fialko, A. S. (1999). Succession in the family firm: a cognitive categorization perspective, Family Business Review, 12(2), 159-170.

Morck, R., & Steier, L. (2005). The global history of corporate governance: an introduction. In R. Morck(Ed.), A History of Corporate Governance around the World (pp1–64). Chicago, IL: University of Chicago Press.

Perricone, P. J., Earle, J. R., & Taplin, I. M. (2001). Patterns of succession and continuity of family-owned businesses: study of an ethnic community. Family Business Review, 14(2), 105–121.

Schulze, W. S., Lubatkin, M. H., Dino, R. N., & Buchholtz, A. K. (2001). Agency relationships in family firms: theory and evidence. Organization Science, 12, 99–116.

Shah, N. (2012 April 24). Challenges that SMEs face today: Livemint.com. Web site: www.livemint.com http://www.livemint.com/2012/04/25204854/Challenges-that-SMEs-face-today.html

Sharma, P. (1997). Determinants of the satisfaction of the primary stakeholders with the succession process in family firms. Unpublished doctoral thesis, University of Calgary, Canada.

Sharma, P., & Rao, S. (2000). Successor attributes in Indian and Canadian family firms: a comparative study. Family Business Review, 13, 313–330.

Sharma, P., Chua, J. H., & Chrisman, J. J. (2000). Perceptions about the extent of succession planning in Canadian family firms. Canadian Journal of Administrative Sciences, 17, 233-44.

Sharma, P., Chrisman, J. J., Pablo, A. L., & Chua, J. H. (2001). Determinants of initial satisfaction with the succession process in family firms: a conceptual model. Entrepreneurship Theory and Practice, 25(3), 17-35.

Stavrou, E. (1999). Succession in family businesses: Exploring the effects of demographic factors on offspring intentions to join and take over the business. Journal of Small Business Management, 37(3), 43-61.

Tatoglu, E., Kula, V., & Glaister, K. W. (2008). Succession planning in family owned business. International Small Business Journal, 26(2), 155-180.

Trow, D. (1961). Executive succession in small companies. Administrative Science Quarterly, 6(2), 228-239.

Ward, J. L. (1987). Keeping the family business healthy: how to plan for continuing growth, profitability and family leadership. San Francisco, CA: Jossey-Bass.

Ward, J. L. (1990). The Succession Process: 15 Guidelines, Small Business Forum. 8(3), 57-62.

Volume XIX, Issue (1) (2023) 88-99

International May Conference on Strategic Management

THE LINKS BETWEEN THE EUROPEAN GREEN DEAL AND CORRUPTION

Rita Remeikiene*, Ligita Gaspareniene

Public Safety Academy, Mykolas Romeris University, Lithuania

Abstract: The European Green Deal aims to make the European Union's economy sustainable by turning climate and environmental issues into opportunities and ensuring a fair and inclusive energy transition to reduce corruption. The links between the European Green Deal and the corruption is revealed by management indicators related to the legal system, including corruption control, which has a significant long-term impact on the amount of GHG emissions in EU countries. Corruption can interact with the European Green Deal both negatively and positively. Negative interactions arise from citizens' distrust of government institutions, obstacles that arise for investors seeking to increase industrial efficiency and ensure environmental quality. Corruption environment, bribery cases and extreme use of natural resources are not favorable for the implementation of green technologies. Meanwhile, a positive interaction is associated with a faster process, in order to avoid bureaucratic obstacles and accelerate environmental implementation processes. The purpose of the article is to determine the links between the European Green Deal and the corruption in EU countries and to reveal the impact of interactions on the implementation of the EU countries' greening strategies. Methods used in the research: analysis of legal acts, scientific comparative analysis of literature.

Keywords: The European Green Deal, corruption, EU countries, links between the European Green Deal and corruption.

1. INTRODUCTION

Recently, the world has faced various environmental problems. Therefore, many countries are forced to take decisive actions such as environmental regulations to overcome the worsening environmental problems (Abdulrasheed et al., 2022). These strict environmental regulations have encouraged people to look for more efficient ways to comply with the regulations, including green innovation. Green innovation minimizes environmental impact (He et al., 2018; Balsalobre-Lorente & Leit~ao, 2020). This shows that green innovation plays an important role in overcoming various environmental problems. As an example, we can mention the 17 sustainable development goals set by 2030 agenda, and a strong focus on activities to promote green energy solutions and clean air (Simsek et al., 2020; Capron et al., 2020). European Commission in July 14, 2021 adopted a package of legislative proposals "Tink 55" (Revision of the Renewable Energy Directive: Fit for 55 Package, 2021). This was done in line with the European Green Deal, which prioritizes strengthening the EU's position as a global leader on climate change. This will be a challenge

* *Corresponding author: rita.remeikiene@mruni.eu*

for many Member States and is already the subject of fierce internal criticism and purely political disputes, especially when taking into account the particularly strong lobbying of industrial organizations and trade unions in the "dirty" energy sector in some countries. This shows that during the implementation of environmental innovations and public procurement, solving environmental problems is faced with corruption and these problems need to be solved (Dec & Wysocki, 2022).

Although corruption is not harmful to the environment (Abdulrasheed et al., 2022), it can lead to poor governance by hindering the formulation of environmentally sound policies, e.g. creation and procurement of technological innovations (Balsalobre-Lorente et al., 2021). Xia et al. (2018) argue that corruption can affect small and medium-sized enterprises (SMEs) innovation. SME's are scrambling to offer bribes to avoid regulation and allow innovation. Similarly, strict environmental regulations can encourage corruption related to the cost of bribery to promote green innovation (Fu & Jian, 2021). In addition to regulations, corruption could promote green innovation through public procurement, purchasing products that affect environmental protection. Corruption can harm the environment by increasing the number of technological disasters such as industrial risks, transportation and other accidents (Yamamura, 2014). In addition to accidental disaster, corruption can also indirectly harm the likelihood of green innovation by weakening governance systems, which in turn weakens firms' incentives to innovate and may lead to a negative effect of corruption on innovation in general (Lee et al., 2021). Likewise, Balsalobre-Lorente et al. (2019) argue that corruption has a detrimental effect on energy innovation. Possible reasons for this negative relationship include factors such as the misallocation of labor and capital caused by corruption (Hao et al., 2020). Another way in which corruption affects green innovation is through politics. Political corruption hinders innovation because it reduces the incentives for innovation caused by the high risk of extortion and the reduced threat of competition (Huang & Yuan, 2021). These studies show that the implementation of the Green Deal can reduce corruption in solving environmental problems. Therefore, this article aims to analyse the interactions between the Green Deal and corruption in EU countries.

The aim of the article to determine the links between the European Green Deal and the corruption in EU countries and to reveal the impact of interactions on the implementation of the EU countries' greening strategies. In order to fulfil the main aim, the following tasks were set: to analyse the concept and features of the Green Deal and to identify the interactions between the Green Deal and corruption in EU countries from a theoretical point of view.

Research methods: analysis of legal acts, review of scientific literature analysis.

2. THE CONCEPT AND FEATURES OF THE EUROPEAN GREEN DEAL

In December, 2019, the European Commission announced its plans to address climate and environmental challenges – the European Green Deal (European Commission, 2019). Responding to climate change, environmental risks and pollution of forests and oceans, it "aims to transform the EU into a just and prosperous society with a modern, resource-efficient and competitive economy with zero net greenhouse gas emissions by 2050 (European Commission, 2019).

The recognition of climate change as the EU's biggest medium- and long-term challenge has paved the way for limiting global warming as a priority goal. Achieving carbon neutrality requires highly transformative policies and environmentally sustainable growth. The European Green Deal consolidates a set of political initiatives covering different policy areas: clean energy, sustainable industry, construction and renovation, farm to table (sustainable

food system), eliminating pollution, sustainable mobility and biodiversity (Bongardt & Torres, 2022).

The main objective of the European Green Deal strategy is to place sustainability and human well-being at the center of economic policy and as a central aspect of all policy decisions and related actions. Achieving the goal of climate neutrality will only be possible with the participation of all stakeholders from different sectors such as construction, biodiversity, energy, transport, agriculture and food. The areas of interest of the European Green Deal strategy are presented in figure 1.

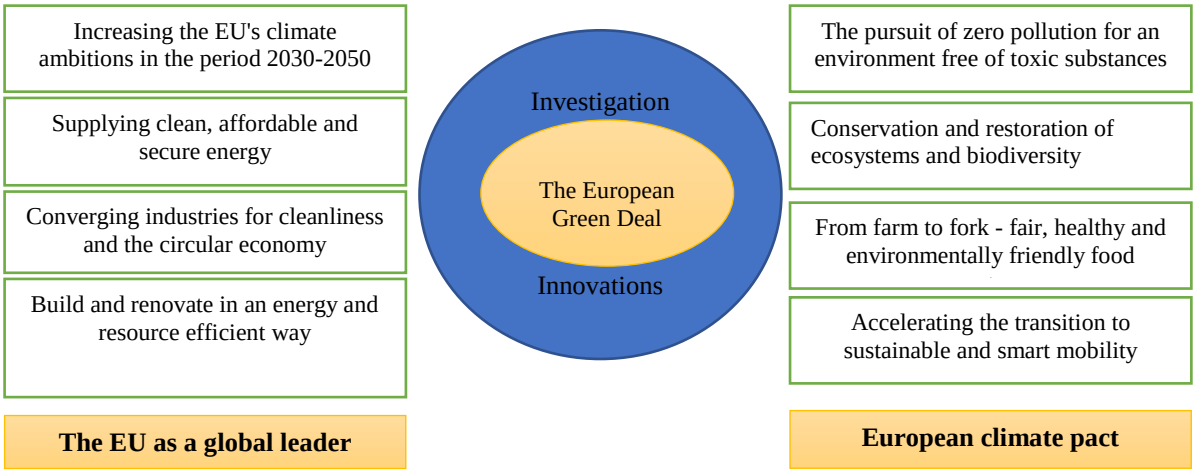


Figure 1. The European Green Deal (Communication from The Commission to The European Parliament, 2019)

Specific action plans are provided for implementation in the areas indicated in Figure 1. For example, plans for clean, affordable and secure energy, the implementation of the Renovation Wave initiative in the building sector and the offshore wind energy strategy. The Clean and Circular Economy Industrial Strategy includes a Circular Economy Action Plan. An organic common agricultural policy is based on a farm-to-fork strategy, assuming a significant reduction in the use and risks of chemical pesticides, fertilizers and antibiotics (Szpilko & Ejdys, 2022).

As Knez et al. (2022) point out, apart from a strategy, the European Green Deal (2019) is also a response to challenges. The European Green Deal is a strategy of the European Commission (hereinafter referred to as the EC) aimed at implementing the United Nations Agenda by 2030, and sustainable development goals (The European Green Deal, 2019), part of which aims to transform the EU into a prosperous society characterized by a modern, resource-efficient and competitive economy, where by 2050 there will be no net GHG emissions and where economic growth will be decoupled from resource use. It also aims to protect, conserve and nurture the EU's natural capital and protect citizens' health and well-being from the risks and impacts of environmental change. The EC has proposed a new (8th) Environmental Action Program to support the European Green Deal and includes new monitoring mechanisms to ensure that Europe continues to meet its environmental targets. The EU must lead international coordination to create a coherent financial system that supports sustainable solutions. The EU and its Member States have made a substantial commitment to adapt to climate change and have begun to address these challenges at all levels through adaptation strategies. The most important of these are the national energy and

climate action plans and the proposed strategic national plans for the implementation of the common agricultural policy. The EC called on all Member States to develop adaptation strategies in line with national climate change risk mitigation plans, including transboundary issues. It also supports the efforts of European cities to develop local adaptation strategies and plans. Local climate change adaptation strategies and plans will increase support for local activities, provide a platform for more active municipal participation and networking, and increase public awareness of climate change adaptation. In order to address the issue of adaptation of the most vulnerable sectors, the EC continues to integrate adaptation to climate change into EU policies. The EC also aims to increase the resilience of infrastructure to climate change in Europe by revising existing standards in the areas of energy, transport and construction. Member States must also ensure effective implementation of all policies and legislation.

This commitment to carbon neutrality by the European Commission and commitment to the Paris Agreement comes at a time when decarbonisation pathways and the question of how to achieve net zero greenhouse gas (GHG) emissions by the middle of this century have been widely analyzed by research and government bodies. Important examples are the Intergovernmental Panel on Climate Change (IPCC) Special Report on 1.5 °C (IPCC, 2018), various European Commission (EC) (2018), (2020), Nijs (2018) and studies by non-governmental research institutions such as the Wuppertal Institute (Kobiela, 2020), the Öko Institute (Matthes et al., 2018) or CLIMACT and ECF (Climact, 2018). Most of these studies combine at least two different methodologies, i.e. area of energy system modeling and scenario analysis. On the one hand, energy system modeling, while initially driven by energy security and cost concerns, is now largely driven by climate change policy and the need to set meaningful greenhouse gas reduction targets (Meinshausen et al., 2009; Pfenninger et al., 2014). Interpreting the results generated by energy system models can sometimes be difficult and confusing, especially if the raw numbers are taken as the output of the model. On the other hand, scenario development and analysis appear to be the predominant way of using energy system models. Scenarios, and more specifically the relative differences in outcomes across scenarios, can aid communication at the modeler-policy interface by highlighting the insights that can be derived from model outputs (Strachan et al., 2016).

Summarizing the concept and features of the Green Deal, it can be said that the European Green Deal is a European strategy aimed at implementing the United Nations Agenda by 2030 and goals of sustainable development; and it aims to transform the EU into a prosperous society characterized by a modern, resource-efficient and competitive economy, where by 2050 there will be no net GHG emissions and where economic growth will be decoupled from resource use. The Green Deal through the lens of sustainability is a comprehensive program that aims to reshape the EU's economic model, incorporating all previous economic coordination efforts in a structured and coherent manner. Analyzing the scientific literature, it was observed that the implementation of the European Green Deal relies on the existing EU economic management system, especially in climate and energy policy. This would also help solve corruption problems in the climate and energy fields.

3. THE INTERACTION OF THE GREEN DEAL AND CORRUPTION IN THE EU

The misuse of fossil fuel energy subsidies is one of the main areas of corruption, as several researchers have pointed out (Ferraresi et al., 2018). In such a situation, the implementation of cleaner production processes in EU countries can be initiated by the transfer of technology, because trade openness has a positive effect on the quality of the

environment even in the presence of corrupt practices. In addition, they have already begun to industrialize nations, to implement cleaner production processes to control environmental degradation, and the existing urban infrastructure is facing challenges due to urbanization, (Roy et al., 2018). Consequently, policymakers are encouraging people-to-people, public-private partnerships, and this is one way to ensure its implementation for renewable energy and cleaner production processes while reducing the interference of corruption (Chen, 2019). According to Shahbaz and Sinha (2019), if these partnerships can increase the level of environmental awareness among citizens, then policymakers can be forced to strengthen environmental legislation, thus reducing the number of cases of corruption.

The European Green Deal aims to make the European Union's economy sustainable, turning climate and environmental issues into opportunities and ensuring a fair and inclusive energy transition (Tutak et al., 2021), aiming to reduce corruption. The European Commission emphasizes that it is important to reconsider the EU's approach to energy, energy security and climate change when implementing the Green Deal. By investing heavily in the green, circular economy under the European Green Deal, the European Union aims to lead by example in achieving the goal of 2050 to create the first carbon-neutral economy (Wolf et al., 2021).

As Simionescu et al. (2022) point out, the European Green Deal target of 2050 being to reduce net greenhouse gas emissions to zero, the innovation of this paper lies in the effective proposal of measures to improve the quality of governance to achieve this goal, which includes reducing corruption. Analysing the interaction between the European green deal and corruption, the aforementioned author points out that governance indicators related to the legal system, which also includes corruption control, had a significant long-term impact on the amount of GHG emissions in EU countries. Therefore, policy measures should focus more on the elimination of corruption, more freedom for citizens to express and support their ideas for better governance, and better awareness of the ability of governors to propose effective rules and policies. Simionescu et al. (2022) argue that less corruption ensures a better image of the government and citizens benefit from a transparent environment.

This is also confirmed by studies in other countries, such as BRICS in 1996-2017 (Baloch & Wang, 2019) and 19 Southeast Asian countries in 2002-2016 period (Gill et al., 2019). The results showed that better management in these countries reduces CO_2 emissions. These studies focus more on corruption, which has been shown to increase pollution in the BRICS between 1990 and 2017 (Sinha et al., 2019) and 16 OECD countries in 1995-2016 (Balsalobre-Lorenteir et al., 2019). The analysis focuses on 10 Central and Eastern European (CEE) countries (represented by Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) because these countries have similar political and economic characteristics that allow them to have similar trends in GHG emissions. In addition, these countries have more corruption problems and are less economically and socially developed than the EU's new member states, so it is more necessary to improve the quality of governance in order to support sustainable development and reduce the gap between them and the developed EU countries. Historically, these countries belonged to the same communist bloc until the 1990s. These countries joined the EU in 2004 and 2007 and are known as the EU's new member states. This policy is not generalizable to all EU countries. This policy is aimed at countries that are economically and socially less developed compared to the old Member States. Geographically, these countries are located in Central and Eastern Europe, so greenhouse gas emissions in one country depend on pollution in a country in another zone.

Dec and Wysocki (2022) pointed out that in the countries where corruption phenomena, which are actually a sign of the weakness of certain public administration institutions, occur

more often, they become a factor that slows down many processes, including, for example, air decarbonization, emission of solid particles and other air pollutants and installation of renewable energy sources. This is an important issue because corruption, usually measured by its perception indicator, not only destroys citizens' trust in the state (Pellegata & Memoli, 2016), but also blocks investors' activities, including activities in the field of environmental protection. As a rule, due to its appearance, these processes take place more slowly and do not arouse anyone's interest due to the high costs of their implementation and the lack of financial support from the state. In this situation, in countries with high levels of corruption, investors are reluctant to engage in investment activities in order to avoid the risk of their failure and financial losses as a result (Brada et al., 2019).

Yao et. al. (2021) also confirmed that corruption control can be the biggest obstacle for investors to increase efficiency and ensure environmental quality. If there is no corruption in the public sector, the system can be used in a secure judicial system to generate information, efficiently allocate funds and resources, attract foreign investment, thereby accelerating economic growth and improving the quality of the environment (Shah et. al., 2019). At the same time the corrupt environment, bribery cases and extreme use of natural resources are not favourable for the implementation of green technologies. Energy Improvement Plan projects may not be implemented to reduce carbon emissions or may not achieve the best expected results. Corruption distorts the green energy investment market (Halkos et al., 2015). Corruption is also very important for energy efficiency (Apergis & Garacıa, 2019). Environmental degradation may be related to the flexibility of environmental laws (Yang et al., 2018). Sometimes the environment deteriorates due to poor management of these environmental laws (Yuan & Xiang, 2018). At the same time, corruption among government leaders also hinders the implementation of projects to promote energy efficiency, such as renewable energy and cleaner manufacturing processes (Gupta, 2016). Corruption reduces energy efficiency across all income groups.

Balsalobre-Lorente et al. (2019) argue that corruption has a detrimental effect on energy innovation. Possible reasons for this negative relationship include factors such as the misallocation of labor and capital caused by corruption (Hao et al., 2020). Another way in which corruption affects green innovation is through politics.

Political corruption hinders innovation because it reduces the incentives for innovation caused by the high risk of extortion and the reduced threat of competition (Huang & Yuan, 2021). These studies suggest that the link between green innovation and corruption depends on the sand-in-the-wheels and grease-the-wheels hypotheses. The first set of studies (Nguyen et al., 2016; Lee et al., 2021) supports the “wheels of sand” hypothesis, which argues that corruption hinders the effective exercise of authority by government and hinders innovation. However, the grease-the-wheels hypothesis states that due to institutional weakness, firms will be forced to pay their own money by offering bribes to bypass all regulations and achieve innovation (Habiyaremye & Raymondas, 2013; Goedhuys et al., 2016; Nguyen et al., 2016; Ganda, 2020; Kabadurmus & Sylwester, 2020). Although these studies provide some evidence of innovation in corruption, they tend to be micro-level analyses and do not focus on different types of innovation, such as green innovation. Green innovation differs from other forms of innovation due to its higher failure rate and the social dimension of the benefits it provides. Unlike other innovations, any environmental innovation may not have a direct economic impact on a company's bottom line. Moreover, environmental protection is perceived as a social responsibility rather than a profit-seeking approach (Balsalobre-Lorente et al., 2019). It is therefore likely that corruption has a different effect on green innovation. One such innovation is the European Green Deal.

Goedhuys et al. (2016) argue that corruption is likely to reduce firm innovation in both developmental and environmental terms, but may have a positive effect in interaction with institutional barriers. This suggests that the relationship between corruption and green innovation depends on mediating factors such as bureaucratic bottlenecks, especially related to business permits and product innovation licenses. Zhou et al. (2019) confirm a similar relationship when they find that R&D spending is insufficient for the development of environmental patents. On the other hand, the development of environmental patents can only be improved if corruption accelerates R&D spending. Another reason to support the wheel-greasing approach is that companies report more barriers, so companies offer bribes to avoid regulatory barriers and expand innovation for business development and environmental performance (Kabadurmus & Sylwester, 2020). Therefore, anti-corruption campaigns aimed at reducing corruption have only a substantial effect on improving human development, not on increasing innovation (Silva & Moreira, 2020) (see Fig. 2).

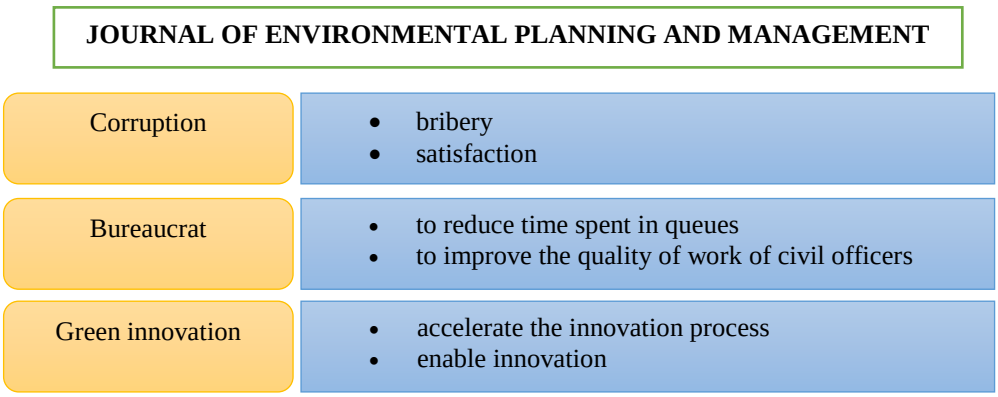


Figure 2. Grease-the-wheel hypothesis (Abdulrasheed et al., 2022, p.5)

Fig. 2 shows the relationship between corruption and green innovation. Bad bureaucracy is seen as weak and inefficient; therefore, it takes corruption to tarnish it. Abdulrasheed et al. (2022) argue that because of bureaucracy corruption can reduce time spent in queues for improving green innovation. Similarly, green innovation could be promoted by changing the bureaucracy, which improves the quality of civil servants (Abdulrasheed et al., 2022). Due to insufficient pay in the civil service, there is bribery and gratification, which can attract civil servants as another area of business.

Ganda (2020) argues that corruption can be a two-way interaction. On the one hand, this positively affects the ongoing sustainability of the environment, while on the other hand, it damages the natural environment in the long run. Similarly, foreign firms that engage in corrupt practices discourage host countries from investing in research and development, when long-term effects are associated with a slow ability to bring a new product to market (Habiyaremye & Raymond, 2013).

Summarizing it can be said that the European Green Deal aims to make the economy of the European Union sustainable by turning climate and environmental issues into opportunities and by ensuring a fair and inclusive energy transition. Analyzing the interaction between the European Green Deal and corruption, it is indicated that governance indicators related to the legal system, which also includes corruption control, had a significant long-term impact on the amount of GHG emissions in EU countries. Corruption can interact with the European Green Deal both negatively and positively. Negative interactions are associated with distrust of citizens, obstacles for investors to increase efficiency and ensure environmental quality, and have a negative impact on energy innovation. At the same time,

the corrupt environment, bribery cases and extreme use of natural resources are not favorable for the implementation of green technologies. Positive interaction is associated with a faster process, in order to avoid bureaucratic obstacles and accelerate environmental protection processes. On the one hand, the interaction between the Green Deal and corruption positively affects the ongoing sustainability of the environment, and on the other hand, it damages the natural environment in the long run.

4. CONCLUSIONS

1. After presenting the concept and features of the European Green Deal, it can be said that the European Green Deal is a European strategy aimed at implementing the United Nations Agenda by 2030 and sustainable development goals. It aims to transform the EU into a prosperous society characterized by a modern, resource-efficient and competitive economy, where by 2050 there will be no net GHG emissions and where economic growth will be decoupled from resource use. The Green Deal through the lens of sustainability is a comprehensive program that aims to reshape the EU's economic model, incorporating all previous economic coordination efforts in a structured and coherent manner. The implementation of the European Green Deal builds on the existing EU economic governance system, especially in climate and energy policy. This would also help solve corruption problems in the climate and energy fields.

2. After identifying the interactions between the Green Deal and corruption in the EU countries from a theoretical point of view, it can be stated that the European Green Deal aims to make the EU economy sustainable, by turning climate and environmental issues into opportunities and by ensuring a fair and inclusive energy transformation, aiming to reduce corruption. The interaction between the European Green Deal and corruption is shown by the fact that management indicators related to the legal system include corruption control, which has a significant long-term impact on the amount of GHG emissions in EU countries. Corruption can interact with the European Green Deal both negatively and positively. Negative interactions are associated with distrust of citizens, obstacles for investors to increase efficiency and ensure environmental quality, and have a negative impact on energy innovation. At the same time, the corrupt environment, bribery cases and extreme use of natural resources are not favorable for the implementation of green technologies. Positive interaction is associated with a faster process, in order to avoid bureaucratic obstacles and accelerate environmental protection processes. On the one hand, the interaction between the Green Deal and corruption positively affects the ongoing sustainability of the environment, and on the other hand, it damages the natural environment in the long run.

REFERENCES

Abdulrasheed, Z., Vincent, T., Babajide, O., & Rafael, A. (2022). The impact of corruption on green innovation: the case of OECD and non-OECD countries. Journal of Environmental Planning and Management.

Apergis, N., & Garacıa, C. (2019). Environmentalism in the EU-28 context: the impact of governance quality on environmental energy efficiency. Environ Science and Pollution Research, 26 (36), 37012 - 37025.

Balsalobre-Lorente, D., & Leit~ao, N. C. (2020). The Role of Tourism, Trade, Renewable Energy Use and Carbon Dioxide Emissions on Economic Growth: Evidence of

Tourism-Led Growth Hypothesis in EU-28. Environmental Science and Pollution Research International, 27 (36), 45883 - 45896.

Balsalobre-Lorente, D., Alvarez-Herranz, A., & Shahbaz, M. (2019). The Long-Term Effect of Economic Growth, Energy Innovation, Energy Use on Environmental Quality. In Energy and Environmental Strategies in the Era of Globalization, edited by M. Shahbaz and D. Balsalobre, 1–34. Cham: Springer.

Bongardt, A., & Torres, F. (2022). The European Green Deal: More than an Exit Strategy to the Pandemic Crisis, a Building Block of a Sustainable European Economic Model. JCMS, 60 (1), 170 – 185.

Brada, J.C., Drabek, Z., Mendez, J.A. & Perez, M.F. (2019). National levels of corruption and foreign direct investment. Journal of Comparative Economics, 47, 31 – 49.

Capron, M. E., Stewart, J. R., de Ramon N' Yeurt, A., Chambers, M. D., Kim, J. K., Yarish, C., Jones, A. T., Blaylock, R. B., James, S. C., & Fuhrman, R. (2020). Restoring Pre-Industrial CO2 Levels While Achieving Sustainable Development Goals. Energies, 13, 4972.

Chen, K. (2019). How bad corruption is around the world? International Politics Reviews, 1-11.

Climact. (2018). Net zero by 2050: from whether to how - zero emission pathways to the Europe we want. Technical Report. Den Haag, The Netherlands: CLIMACT and European Climate Foundation. Access from internet: https://europeanclimate.org/wp-content/uploads/2019/12/09-19-net-zero-by-2050-from-whether-to-how-executive-summary.pdf

Communication from The Commission to The European Parliament (2019). The European Council, The Council, The European Economic and Social Committee and The Committee of the regions. The European Green Deal, COM 640.

Dec, P., & Wysocki, J. (2022). In Search of Non-Obvious Relationships between Greenhouse Gas or Particulate Matter Emissions. Renewable Energy and Corruption. Energies, 15, 1347.

Ejdys, J., & Szpilko, D. (2022). European Green Deal – research directions. a systematic literature review. Economics and Environment, 81(2), 8 - 38.

Ejdys, J., & Szpilko, D. (2022). European Green Deal – research directions. a systematic literature review. Economics and Environment, 81(2), 8 - 38.

European Commission. (2018). A clean planet for all - a European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy. Technical Report COM(2018) 773 final. Belgium: European Commission. Brussels.

European Commission. (2019). The European Green Deal. Communication from the commission to the European parliament, the European Council, the Council, the European economic and social committee and the committee of the regions COM 640. Belgium: European Commission. Brussels. Access from internet: https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

Ferraresi, M., Kotsogiannis, C., & Rizzo, L. (2018). Decentralization and fuel subsidies. Energy Economics, 74, 275 - 286.

Fu, T., & Jian, Z. (2021). Corruption Pays Off: How Environmental Regulations Promote Corporate Innovation in a Developing Country. Ecological Economics 183, 106969.

Ganda, F. (2020). The Influence of Corruption on Environmental Sustainability in the Developing Economies of Southern Africa. Heliyon 6 (7), e04387.

Gill, A. R., Hassan, S., & Viswanathan, K. K. (2019). Is democracy enough to get early turn of the environmental Kuznets curve in ASEAN countries? Energy Environ 30 (8), 1491–1505.

Goedhuys, M., Mohnen, P., & Taha, T. (2016). Corruption, Innovation and Firm Growth: Firm Level Evidence from Egypt and Tunisia. Eurasian Business Review 6 (3), 299 - 322.

Gupta, M. (2016). Willingness to pay for carbon tax: a study of Indian road passenger transport. Transport Policy, 45, 46-54.

Habiyaremye, A., & Raymond, W. (2013). Transnational Corruption and Innovation in Transition Economies. MERIT Working Papers 2013-050, United Nations University - Maastricht Economic and Social Research Institute on Innovation and Technology (MERIT).

Halkos, G., Sundstrom, A., & Tzeremes N. (2015). Regional environmental performance and governance quality: a nonparametric analysis. Environmental Economics and Policy Studies, 17, 621-644.

Hao, Y., Gai, Z., & Wu, H. (2020). How Do Resource Misallocation and Government Corruption Affect Green Total Factor Energy Efficiency? Evidence from China. Energy Policy 143, 111562.

He, L., Chen, Y., & Li, J. (2018). A Three-Level Framework for Balancing the Trade offs among the Energy, Water, and Air-Emission Implications within the Life-Cycle Shale Gas Supply Chains. Resources, Conservation and Recycling, 133, 206 – 228.

He, L., Chen, Y., Zhao, H., Tian, P., Xue, Y., & Chen, L. (2018). Game-Based Analysis of Energy-Water Nexus for Identifying Environmental Impacts during Shale Gas Operations under Stochastic Input. The Science of the Total Environment 627, 1585 - 1601.

Huang, Q., & Yuan, T. (2021). Does Political Corruption Impede Firm Innovation? Evidence from the United States. Journal of Financial and Quantitative Analysis, 56 (1), 213 - 248.

IPCC. (2018). Global Warming of 1.5◦ C. An IPCC Special Report on the impacts of global warming of 1.5◦ C above pre-industrial levels and related global greenhouse gas emission pathways in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Technical Report. Access from internet: www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf

Kabadurmus, F. N. K., & Sylwester, K. (2020). Corruption and Innovation: The Importance of Competition. International Journal of Emerging Markets, 1, 1 – 23.

Knez, S., Štrbac, S., & Podbregar, I. (2022). Climate change in the Western Balkans and EU Green Deal: status, mitigation and challenges. Energy, Sustainability and Society, 12 (1).

Kobiela, G. (2020). CO_2-neutral bis 2035: eckpunkte eines deutschen Beitrags zur Einhaltung der 1,5-◦C-Grenze; Diskussionsbeitrag für Fridays for Future Deutschland. Technical Report. Germany: Wuppertal Institut für Klima, Umwelt, Energie. Wuppertal. Access from internet: http://nbn-resolving.de/urn:nbn:de:bsz:wup4-opus-76065

Lee, C. C., Wang, C. W., & Ho, S. J. (2021). Country Governance, Corruption, and the Likelihood of Firms' Innovation. Economic Modelling, 92, 326 - 338.

Matthes, F., Blanck, R., Greiner, B., & Zimmer, W. (2018). The vision scenario for the European union 2017 update for the EU-28. Technical Report. Access from internet: http://extranet.greens-efa-service.eu/public/media/file/1/5491

Meinshausen, M., Meinshausen, N., Hare, W., Raper, S.C., Frieler, K., Knutti, R., Frame, D.J., & Allen, M.R. (2009). Greenhouse-gas emission targets for limiting global warming to 2 degrees C. Nature, 458 (7242), 1158-62.

Nguyen, N. A., Doan, Q. H., Nguyen, N. M., & Tran-Nam, B. (2016). The Impact of Petty Corruption on Firm Innovation in Vietnam. Crime, Law and Social Change, 65 (4-5), 377 - 394.

Nijs, W. (2018). Deployment scenarios for low carbon energy technologies. Technical Report EUR 29496 EN. Brussels, Belgium: Publications Office of the European Union.

Pellegata, A., & Memoli, V. (2016). Can corruption erode confidence in political institutions among European countries? Comparing the effects of different measures of perceived corruption. Social Indicators Research, 128, 391-412.

Pfenninger, S., Hawkes, A., & Keirstead, J. (2014). Energy systems modelling for twenty-first century energy challenges. Renewable and Sustainable Energy Reviews, 33, 74-86.

Revision of the Renewable Energy Directive: Fit for 55 Package. European Parliamentary Research Service (2021). Access from internet: https://www.europarl.europa.eu/thinktank/pl/document/EPRS_BRI(2021)698781

Roy, V., Schoenherr, T., & Charan, P. (2018). The thematic landscape of literature in sustainable supply chain management (SSCM). A review of the principal facets in SSCM development. International Journal of Operations & Production Management 38(4), 1091-1124.

Shah, W.U.H, Yasmeen, R., & Padda, I.U.H. (2019). An analysis between financial development, institutions, and the environment: a global view. Environmental Science and Pollution Research, 26 (21), 21437-21449.

Shahbaz, M., & Sinha, A. (2019). Environmental Kuznets Curve for CO2 Emissions: A Literature Survey. Journal of Economics Studies 46(1), 106-168.

Silva, P., & Moreira, A. C. (2020). The Relationship between Culture and Human Development: An Analysis through the Lens of Innovation and Corruption. In Recent Advances in the Roles of Cultural and Personal Values in Organizational Behaviour, 187 - 212. Hershey, PA: IGI Global. Access from internet: https://www.igi-global.com/chapter/the-relationship-between-culture-and-human-development/235678

Simionescu, M., Strielkowski, W., & Gavurova, B. (2022). Could quality of governance influence pollution? Evidence from the revised Environmental Kuznets Curve in Central and Eastern European countries. Energy Reports, 8, 809 - 819.

Simsek, Y., Santika, W. G., Anisuzzaman, M., Urmee, T., Bahri, P. A., & Escobar, R. (2020). An analysis of additional energy requirement to meet the sustainable development goals. Journal of Cleaner Prodiuction, 272, 122646.

Sinha, A., Gupta, M., Shahbaz, M., & Sengupta, T. (2019). Impact of corruption in public sector on environmental quality: implications for sustainability in BRICS and next 11 countries. Journal of Cleaner Production, 232, 1379–1393.

Strachan, N., Fais, B., & Daly, H. (2016). Reinventing the energy modelling-policy interface. Nature Energy, 1, 16012.

Tutak, M., Brodny, J., & Bindzár, P. (2021). Assessing the level of energy and climate sustainability in the European union countries in the context of the European green deal strategy and agenda 2030. Energies 14 (6), 1767.

Wolf, S., Teitge, J., Mielke, J., Schütze, F., & Jaeger, C. (2021). The European Green Deal – More than Climate Neutrality'. Intereconomics, 56 (2), 99 - 107.

Xia, H., Tan, Q., & Bai, J. (2018). Corruption and Technological Innovation in Private Small-Medium Scale Companies: Does Female Top Management Play a Role? Sustainability, 10
(7), 2252.

Yamamura, E. (2014). Impact of Natural Disaster on Public Sector Corruption. Public Choice, 161 (3 - 4), 385 - 405.

Yang, J., Guo, H., Liu, B., Shi, R., Zhang, B., & Ye, W. (2018). Environmental regulation and the Pollution Haven Hypothesis: do environmental regulation measures matter? Journal of Cleaner Production, 202, 993-1000.

Yao, X., Yasmeen, R., Hussain, J., Hassan S., & Wassi, U. (2021). The repercussions of financial development and corruption on energy efficiency and ecological footprint: Evidence from BRICS and next 11 countries. Energy, 223©.

Yuan, B., & Xiang, Q. (2018). Environmental regulation, industrial innovation and green development of Chinese manufacturing: based on an extended CDM model. Journal of Cleaner Production 176 (4), 895-908.

Zhou, X. B., Wei, W., Jang, C. L., & Chang. C. P. (2019). The Impacts of Government R&D Expenditure on Innovation in Chinese Provinces: What's the Role of Corruption. Bulletin of Monetary Economics and Banking, 21 (3), 409 - 430.

Volume XIX, Issue (1) (2023) 100-108

International May Conference on Strategic Management

EXPLORING THE IMPACT OF DEMOGRAPHICS AND MARITAL STATUS ON LEAD-USER INNOVATION

Geoffrey Otieno*

Strathmore University, Nairobi, Kenya

Abstract: This study examines the impact of age, gender, and marital status on lead-user innovation success or failure. Further, this study explores the role of individual innovators rather than the role of firms in influencing outcomes, and the study's findings can be used to guide future policy and pedagogical frameworks. This study used a quantitative approach, wherein data from 321 respondents to a quantitative survey were analyzed. The data were analyzed using SPSS for principal components and regression analysis. The results indicated that the age of the innovator is a significant factor in lead-user innovation outcomes. Furthermore, marital status only demonstrated significance when integrated with age. The study presents a framework that links age and marital status to lead-user innovation outcomes, thus offering new insights. By showing that marital status demonstrated significance only when integrated with age, the study offers a more nuanced view of the relationship between these demographic variables and innovation outcomes.

Keywords: lead-users, age, marital status, innovation

1. INTRODUCTION

The lead-user approach has been widely recognized as an effective way to develop innovative products and services. However, there is a lack of research on how individual characteristics, such as marital status, can impact the success of lead-user innovation. This study addresses this knowledge gap by examining the relationship between marital status and lead-user innovation success. The relationship between marital status and innovation is an important area of study due to the fact that it can affect an individual's ability to innovate, as it may impact their socio-economic support systems, personal priorities, and time availability.

Researchers are increasingly focusing on understanding the role of individual characteristics in shaping innovation outcomes (Teece, 2021). Numerous researchers, policymakers, and practitioners have studied lead-user innovation in fields ranging from construction products to software systems. However, they disagreed on the characteristics of lead-users and the outcomes that revolve around the phenomenon of lead-user innovation (Hamdi-kidar & Vellera, 2012).

While there is a consensus that trend leadership and expected benefits are important lead-user characteristics, there remains a vigorous debate about which other factors to consider. Despite ample evidence regarding the characteristics of lead-users, the influence of age and marital status remains under-investigated (Yu, 2021). The conflicting views of

* *Corresponding author: geoffrey.otieno@strathmore.edu*

scholars show that the phenomenon needs to be studied in a new context of additional characteristics from a developing or emerging market perspective.

This quantitative study investigates the influence of gender, age, and marital status on the success or failure of lead-user innovation. It attempts to understand whether innovation success be predicted if gender, age, and marital status are determined.

The remainder of this study is organized as follows. Section 2 discusses the concept of lead-user characteristics in the context of financial sector services. We discuss the financial services sector, gender, age, marital status, and outcomes. We introduce recent innovations in financial technological services from an emerging market perspective and extend the discussion to include the innovation results. Section 3 describes the methodology, while Section 4 presents the results by describing the specific effect on each independent variable in terms of total, successful, and failed innovation. Section 5 discusses the findings, and Section 6 concludes this study by discussing the empirical evidence and drawing pedagogical, practical, and policy implications.

1.1. Lead-user characteristics in the financial technology sector

Researchers have sought to determine the true definition and contribution of lead-user innovation through separate studies on lead-user characteristics and innovation outcomes, as well as on different aspects of regional, industry, products, and services (Baregheh et al., 2009).

Financial services sector

In the recent past, global financial markets have thrived in innovations that have mainly focused on developing and diversifying new borrowing sources. The variety of services offered by financial service providers reflects the balance sheets' asset and liabilities. The liability management of modern financial institutions has become an essential part of their integrated approach to financial intermediation from the point of view of involving customers (Buljevich & Park, 1999; Park, 2009). Kenya's financial services have not been excluded from the innovation journey.

According to various scholars, Kenyan banks first deployed the innovative automatic teller machines (ATM) in the 1990s. Since then, ATMs have become essential for banks to provide customers easy, real-time access to hard cash (Barako & Gatere, 2008; Itumo, 2013; Schaner, 2017). In July 2005, the Central Bank of Kenya (CBK) launched a Real Time Gross Settlement (RTGS) system known as the Kenya Electronic Payments and Settlement System (KEPSS) to modernize the country's payment system in line with global trends. According to CBK, this was a great milestone in financial technology innovation in Kenya (CBK, 2006; Misati et al., 2010). The M-PESA was launched by Safaricom in Kenya in March 2007 and has since become the most famous and successful implementation of mobile money services to date (Thinguri et al., 2014). In 2013, Kenya launched the world's first digital credit solution, and ever since the market for digital credit has expanded rapidly in Kenya and other low-income countries (Totolo, 2018).

Lead-user characteristics

In his study, von Hippel (2005) described being ahead of market trends and having the expected benefits from innovation as two critical characteristics of lead-user innovation. This view is supported by empirical studies conducted by scholars, such as Hienerth et al. (2007)

and Franke et al. (2006). Scholars analyzed two characteristics: being at the forefront of a significant market trend, and having a high expected benefit from innovation. Previous studies analyzed industrial products in a developed world context, and therefore it was essential to analyze additional lead-user characteristics to test the lead-user theory in an emerging market context.

If lead-users are identified through variables other than the relative abstract variables of a trend position and the expected benefits from innovation, this might facilitate this valuable user group (Kaulartz & von Hippel, 2018). This study sheds light on whether there is a correlation between age, gender, and marital status and the outcomes of the chosen innovation (Burroughs & Glen Mick, 2004).

1.2. Lead-user outcomes

The outcomes considered in this study included total, successful, and failed innovation. These were based on previous studies that examined all innovations, including successful and failed innovations (Gerben *et al.*, 2003). The methodology used to analyze these outcomes is discussed in the next section.

This study aimed to determine the influence of lead-user characteristics on their outcomes in the financial technology sector in an emerging market setting. This objective led to the hypothesis that lead-users have no impact on innovation outcomes. This study posed one question: *How do the age, gender, and marital status of lead-users impact lead-user innovation outcomes in Kenya's financial technology sector?*

2. METHODOLOGY

This study adopted a quantitative approach. This approach involved a survey of lead-users from various industries to determine whether there is a correlation between marital status and innovation success. A quantitative design was used owing to its valuable assessment in research (Saunders et al., 2019). Quantitative methods have been used in previous studies (Lüthje et al., 2005; Potz et al., 2005; von Hippel, 2005; Antorini & Schultz, 2007). It was challenging to establish the actual population of lead-users; therefore, the researcher introduced Taro Yamane's formula to determine the number of respondents to be interviewed at a 95% confidence level. This formula considered 25.1 million mobile phone users using M-PESA, the most widely used mobile fintech product.

The two purposive sampling phases comprised the first phase of 10 lead-users and the second phase of 321 lead-users. A quantitative approach with 321 respondents (28 females and 293 males) helped to measure the problem. The age bracket of respondents was between 18 and 55 years.

3. RESULTS

3.1. Introduction of gender, age, and marital status

From the independent variable data gathered, there were 321 respondents, of whom only 8.7% were female and 91.3% were male. In terms of age, 2.5% were under the age of 21 years, while the largest group at 37.1% were between 26 and 30 years, and only 0.3% were over 55 years. The women interviewed were between the ages of 21 to 45 years, while the men interviewed had a wider age range from under 21 to over 55 years. Among female lead-users, the majority (39.3%) were between 26 and 30 years. Among men lead-users, the least

number were in the above 55 years category at 0.3% while the most at 36.9% were between 26 and 30 years. In the re-classified data, 60.8% were under 30 years, 36.2% were between 30 and 45 years, and 3% were over 45 years.

Regarding marital status, 52% were single, 41.4% were married, 1.2% were divorced, and 5.3% preferred not to disclose their marital status. Gender wise, 57.1% of the women were single and 42.9% were married, while the men had four categories: 51.5% were single, 41.3% were married, 1.4% were divorced, and 5.8% preferred not to disclose their marital status. In both cases, more than 50% of lead-users were single.

The skewness of the data

Gender (Male and Female combined) was negatively skewed, whereas marital status and age were both positively skewed. The skewness of the data suggests the use of nonparametric tests.

Outcomes

The number of innovations developed was divided into three categories: less than five (85.4% of the total lead-users), five to ten innovations (13.3% of the total lead-users), and more than ten innovations (1.3% of the total lead-users). The number of successful innovations developed was divided into two categories: less than three (76.1% of the total lead-users whose innovations were successful) and at least three or more (23.9% of the total lead-users whose innovations were successful). The number of failed innovations developed was divided in two categories: at least one failed innovation (16.6% of the total lead-users whose innovations failed) and less than one (zero) failed innovation (83.4% of the total lead-users whose innovations failed).

3.2. Influence of age and marital status on outcomes

The following sections evaluate the effects of independent variables on the three outcomes. Since gender was not found to have any significance on its own, the sections below only focus on age and marital status.

Influence of Age and marital status on total innovation outcomes

Of the lead-users, 85.4% developed fewer than five financial technology innovations, while 14.6% developed five or more. Nonparametric regression models were uniformly used for all independent variables.

Table 1. Characteristics Parameter estimates for the number of fintech innovations

Parameter Estimates							
		Estimate	Std. Error	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold	Less than five innovations developed	4.22	51.38	1.00	0.93	-96.47	104.92
	Five or more innovations developed	5.04	51.38	1.00	0.92	-95.67	105.75
Characteristics Independent variables	Female	-0.04	0.17	1.00	0.83	-0.36	0.29
	Male	0[a]		0.00			
	Age Less than 30 years	-0.50	0.55	1.00	0.36	-1.57	0.57
	Age above 30 years	-0.31	0.51	1.00	0.55	-1.32	0.70
	Marital status – single	0.21	0.28	1.00	0.44	-0.33	0.76
	Marital status – married	0.16	0.26	1.00	0.55	-0.36	0.67
	Marital status – divorced	-2.59	42.13	1.00	0.95	-85.16	79.98
Link function: Logit.							
a. The parameters, age above 45, marital status-widowed are set to zero because it is redundant.							

Influence of age and marital status on successful innovation outcomes

The effect of each independent characteristic variable showed that age was significant, implying that it influenced the number of successful innovations developed; this is a novel finding. Based on the B coefficient for the variables, age has a negative effect on the number of successful innovations developed. Age over 30 years had a more negative effect than age under 30 years.

Table 2. Characteristics parameter estimates for successful innovations developed

Numbe.r of successful innovations		B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
						Lower Bound	Upper Bound
At least 3	Intercept	0.09	1.74	0.96			
	Gender	(0.39)	0.59	0.51	0.68	0.22	2.14
	Age Less than 30 years	(17.53)	1.39	0.00*	0.00	0.00	0.00
	Age 30 and above	(18.06)	1.27	0.00*	0.00	0.00	0.00
	Marital status - single	0.09	0.66	0.89	1.10	0.30	4.00
	Marital status - married	(0.13)	0.72	0.85	0.88	0.21	3.59
	Marital status - divorced	1.36	1.41	0.33	3.90	0.25	61.85

Influence of age and marital status on failed innovation outcomes

The effect of each independent variable tested against failed financial technological innovations indicated that age was significant, implying that it influenced the failed innovations developed; this result is a novel finding. Based on the B coefficient for the variables, gender, and marital status (all categories) had positive effects.

Table 3. Characteristics Parameter estimates for failed innovations

Parameter Estimates								
		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[failure2 = 0]	-4.17	1,453.14	0.00	1.00	1.00	-2,852.28	2,843.94
Independent variables - characteristics	Female	0.04	0.29	0.02	1.00	0.90	-0.53	0.60
	Male	0[a]			0.00			
	Age Less than 30 years	4.59	0.74	38.87	1.00	0.00	3.15	6.03
	Age 30 to 45 years	4.80	0.71	45.24	1.00	0.00	3.40	6.20
	Age above 45 years	0[a]			0.00			
	Marital status - single	0.25	0.35	0.50	1.00	0.48	-0.44	0.94
	Marital status - married	0.32	0.38	0.70	1.00	0.40	-0.43	1.07
	Marital status - divorced	3.93	1,887.94	0.00	1.00	1.00	-3,696.37	3,704.22
	Marital status - Prefer not to say	0[a]			0.00			
Link function: Probit.								
a. This parameter is set to zero because it is redundant.								

Interacting age and marital status effect:

When the independent variables interacted with one another, total innovations at the 95% confidence level, being female and between 31 to 35 years old were significant and being female and single were significant. In terms of successful innovations and characteristics, being divorced, single and between 21 to 25 years, single and between 31 to 35 years, married and between 21 to 35 years, and being divorced and between 21 to 25 years was significant.

Table 4. Interactions of characteristics that were significant

Parameter Estimates		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold								
All Financial innovations	[Female] * [31 to 35 years old]	-13,791.75	6,011.92	5.26	1.00	0.02	-25,574.89	-2,008.61
	[Female]* [Single]	4,789.25	1,817.26	6.95	1.00	0.01	1,227.49	8,351.00
Threshold	Divorced	46.29	4.41	110.31	1.00	0.00	37.65	54.92
Location	1–7 years in business	12.47	4.99	6.24	1.00	0.01	2.69	22.25
Successful Innovations	[Single] * [21–25 years]	-53.33	6.26	72.60	1.00	0.00	-65.60	-41.07
	[Single] * [31–35 years]	-17.59	6.54	7.24	1.00	0.01	-30.40	-4.78
	[Married] * [21–25 years]	-16.85	6.42	6.88	1.00	0.01	-29.43	-4.26
	[Married] * [26–30 years]	36.13	5.35	45.56	1.00	0.00	25.64	46.62
	[Married] * [31–35 years]	27.47	4.59	35.89	1.00	0.00	18.48	36.46
	[Divorced] * [21–25 years]	-89.36	5.87	231.60	1.00	0.00	-100.87	-77.85

4. DISCUSSION

The quantitative data results indicate that gender does not influence lead-user innovation outcomes unless it interacts with other variables. Age is significant in successful and failed innovations, and marital status is only significant in successful innovations. These findings support the notion that innovation is recognized as a promising strategy for new ventures, and hence, the significance of the variables (Salehi and Roshandel Arbatani, 2013).

The findings contradict the position taken by Trott et al., (2013), who argued against lead-user innovation, and they either developed alternative theories of innovation or outrightly dismissed the existing ones. They argue that customers are a hindrance rather than a source of innovation and that customers cannot detect the market's future or technology.

For failed innovations, the findings contradict scholars, who believe that lead-users with a high degree of entrepreneurial orientation pioneer radical innovations (Christensen and Bower, 1996). Lead-users in failed innovations cut across both the self-employed and employed categories.

The results enhance the lead-user theory by von Hippel (2005), who states that trend leadership and expected benefits influence lead-user innovation, by adding other characteristics, such as age, gender, and marital status. These were the shortcomings of von Hippel's study of a similar nature, where he stated that he could not manage to capture these identity characteristics.

The selection of Kenya as the area of focus in this study limited the generalizability of the results. Nonetheless, the results were valid in answering the posed research question. Further research is needed to establish the actual effect of the interactions between variables of various characteristics.

5. CONCLUSION

In conclusion, this study demonstrates the value of considering individual characteristics, such as marital status, when examining the factors that contribute to lead-user innovation success. The findings suggest that companies seeking to develop innovative products and services should take into consideration the marital status of their lead-users and lend support to those who may be facing difficulties due to their personal circumstances. (Buchner, 2007).

The data shows that fewer women are engaged in innovation in fintech than men. Further studies are needed to determine the factors contributing to this scenario.

REFERENCES

Antorini, Y.M., & Schultz, M. (2007). Brand Revitalisation through User-Innovation: The Adult Fan of LEGO Community, 11th International Conference on Reputation Brand Identity Competitiveness, BI Norwegian School of Management, Oslo, Norway, May 31 - June 3.

Barako, D., & Gatere, P. (2008). Outsourcing Practices of the Kenyan Banking Sector. African Journal of Accounting, Economics, Finance and Banking Research, 2 (2), 37-50.

Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. Management Decision, 47 (8), 1323-1339.

Buchner, T.W. (2007). Performance management theory: A look from the performer's perspective with implications for HRD". Human Resource Development International,

10 (1), 59-73.
Buljevich, E.C., & Park, Y.S. (1999). Project Financing and the International Financial Markets, Kluwer Academic Publishers, Boston.
Burroughs, J.E., & Glen Mick, D. (2004). Exploring Antecedents and Consequences of Consumer Creativity in a Problem-Solving Context. Journal of Consumer Research, 31 (2), 402-411.
CBK. (2006). Banking Supervision Report 2005.
Chatterji, A., & Fabrizio, K. (2008). The impact of users on technological development: The role of physician innovation in the medical device industry, working paper. Fuqua School of Business, Duke University, Durham.
Christensen, C.M., & Bower, J.L. (1996). Customer power, strategic investment, and the failure of leading firms. Strategic Management Journal, 17 (3), 197-218.
Franke, N., Von Hippel, E., & Schreier, M. (2006). Finding commercially attractive user innovations: A test of lead-user theory. Journal of Product Innovation Management, 23 (4), 301-315.
Hamdi-kidar, L., & Vellera, C. (2012).What drives lead users to become user entrepreneurs? An exploratory study of motivations" R&D Management Conference.
Hienerth, C., Poetz, M., & von Hippel, E. (2007). Exploring key characteristics of lead user workshop participants: who contributes best to the generation of truly novel solutions, paper presented at the DRUID Summer Conference, 2007, Copenhagen, Denmark.
Itumo, N.P. (2013). Relationship between efficiency and financial performance of commercial banks in Kenya. Master Thesis.
Kaulartz, S., & von Hippel, E. (2018). AI Method for Discovering Need-Solution Pairs. Geoscientist, 28 (8), 1-35.
Lüthje, C., & Herstatt, C. (2004). The Lead User method: An outline of empirical findings and issues for future research", R&D Management, 34 (5), 553-568.
Lüthje, C., Herstatt, C., & von Hippel, E. (2005). User-innovators and 'local' information: The case of mountain biking. Research Policy, 34 (6), 951-965.
Matthing, J., Kristensson, P., Gustafsson, A., & Parasuraman, A. (2006). Developing successful technology-based services: The issue of identifying and involving innovative users. Journal of Services Marketing, 20 (5), 288-297.
Misati, R.N., Lucas, N., Anne, K., & Shem, O. (2010). Financial innovation and monetary policy transmission in Kenya. International Research Journal of Finance and Economics, 50 (1), 123-136.
Morgeson, F.P., Reider, M.H., & Campion, M.A. (2005). Selecting individuals in team settings: The importance of social skills, personality characteristics, and teamwork knowledge. Personnel Psychology, 58 (3), 583-611.
Park, Y.S. (2009). The Role of Financial Innovations in the Current Global Financial Crisis. Seoul Journal of Economics, 22 (2), 123-144.
Potz, M., Steger, C., Mayer, I., & Schrampf, J. (2005). Evaluierung von Case Studies zur Lead User Methode, working paper.
Salehi, A., & Roshandel Arbatani, T. (2013). Is branding always beneficial? A meta-analysis of the relationship between branding and performance in SMEs. Advances in Environmental Biology, 7 (14), 4682-4688.
Saunders, M., Lewis, P., & Thornhill, A. (2019). Chapter 4: Understanding research philosophy and approaches to theory development, Research Methods for Business Students (Issue January), Pearson Education.
Schaner, S. (2017). The cost of convenience? Transaction costs, bargaining power, and savings account use in Kenya. Journal of Human Resources, 52 (4), 919-945.

Schreier, M., & Prügl, R. (2008). Extending lead-user theory: Antecedents and consequences of consumers' lead userness. Journal of Product Innovation Management, 25 (4), 331-346.

Teece, D.J. (2021). Frontline IB: David Teece - Academy of International Business (AIB), AIB. https://www.aib.world/frontline-ib/david-teece/

Thinguri, R.W., Onjoro, V., & Wilson, K. L. (2014). Advantages and Disadvantages of M PESA Money Services in Kenya. International Journal of Education and Research, 2 (4).

Totolo, E. (2018). Kenya's Digital Credit Revolution Five Years On, available at: https://www.fsdkenya.org/themes/consumer-insights/the-digital-credit-revolution-in-kenya-an-assessment-of-market-demand-5-years-on/ (accessed 27 February 2023).

Trott, P., Duin, P., & Van Der and Hartmann, D. (2013). Users as innovators? Exploring the limitations of user-driven innovation. Prometheus, 31 (2), 125-138.

Van der Panne, G., van Beers, C., & Kleinknecht, A. (2003). Success and Failure of Innovation: A Literature Review. International Journal of Innovation Management, 7 (3), 309-338.

Von Hippel, E. (2005). State-of-the-art-artikel. Democratizing innovation: The evolving phenomenon of user innovation. *JfB*, 55, 63-78.

Yu, X. (2021). Differences between end user innovators and embedded user innovators in diffusion channel selection: the moderating role of technological advances. European Journal of Innovation Management, ahead-of-print.

Volume XIX, Issue (1) (2023) 109-122

International May Conference on Strategic Management

ECONET WIRELESS ZIMBABWE: A CASE STUDY ON THE USE OF SOCIAL MEDIA MARKETING

E. C. Wessels*, P. T Makwara

University of South Africa (UNISA), Pretoria, South Africa

Abstract: The main aim of this study was to explore the use of social media marketing by Econet Wireless Zimbabwe, a telecommunications business in Zimbabwe. Econet Wireless Zimbabwe was chosen for the study because it is regarded as the market leader in the Zimbabwean telecommunications industry and it uses social media marketing. An exploratory research design that was qualitative in nature was adopted for the study. A case study approach, where Econet Wireless Zimbabwe was the focus of the study, was followed. Ten in-depth interviews were conducted with employees in the marketing department of Econet Wireless Zimbabwe. These employees were selected by means of judgement sampling. The data gathered were analysed by means of Tesch's inductive descriptive coding technique, better known as thematic analysis. The findings indicated that Econet Wireless Zimbabwe uses social media marketing to communicate with its customers. It was further found that Econet Wireless Zimbabwe uses social media marketing because it is inexpensive and has the potential to reach a large number of people in a short time frame.

Keywords: Social media, social media channels, social media marketing, telecommunications industry, Facebook, Instagram, LinkedIn

1. INTRODUCTION

According to Madziwa and Sibanda (2018), social media marketing has become one of the most important business developments to date but it is unknown how much the telecommunications businesses in Zimbabwe have benefitted from the use of digital marketing and social media marketing. Mugwara (2020) states that social media marketing has become very popular among Zimbabwean businesses since 2013. Zimbabweans have become acquainted with digital platforms for business and various business sectors are making use of digital marketing and social media marketing (Madziwa & Sibanda, 2018).

It is important that businesses realise that implementing social media as a marketing strategy could have a positive impact on their sales (Felix et al., 2017). The aim of this research study is to investigate the importance of improving knowledge and understanding of the use of social media marketing in the Zimbabwean telecommunications industry. The current marketing practices at Econet Wireless Zimbabwe are limited. The effective use of social media marketing could allow marketers to collaborate and interact with consumers and to harness the intelligence gathered through social media for marketing purposes (Mehelmi & Sadek, 2019). This study could be of value to the Zimbabwean telecommunications industry by providing new and improved knowledge about the uses of social media marketing,

* *Corresponding author: nellec@unisa.ac.za*

specifically in respect of the importance of having increased interaction with consumers and meeting the demands of customers.

The purpose of this study was, therefore, to explore social media marketing usage within Econet Wireless Zimbabwe as a Zimbabwean telecommunications business. The study was aimed at exploring, within the context of Zimbabwe:

- how Econet Wireless Zimbabwe uses social media marketing;
- the reasons behind Econet Wireless Zimbabwe's use of social media marketing; and
- the most useful social media channels used by Econet Wireless Zimbabwe.

The following section gives a brief overview of the telecommunications industry in Zimbabwe, Econet Wireless Zimbabwe and the use of social media as a marketing strategy. The empirical findings and the discussion of the findings appear in the latter part of the paper.

2. THE TELECOMMUNICATIONS INDUSTRY IN ZIMBABWE

Despite the overall economic challenges experienced worldwide and specifically in Zimbabwe in recent years, the telecommunications industry in Zimbabwe has grown significantly (Global Monitor, 2020). Multiple telecommunications operators offering both voice and data capabilities have entered the market (Research and Markets, 2020). The telecommunications providers in Zimbabwe include Econet Wireless Zimbabwe, Telecel and NetOne and the internet providers include Africom, Liquid Telecom, Powertel and TelOne, to name a few (POTRAZ, 2017; Lancaster, 2022). Econet Wireless Zimbabwe dominates the telecommunications industry; it had the largest market share (65.1%) by the end of 2021, followed by NetOne, with a market share of 30.7 percent, and Telecel, with a market share of 4.2 percent, which is all controlled by the Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) (Techzim, 2022).

Based on the Abridged Postal and Telecommunications Sector Performance Report of 2021, it is evident that 62.6 percent of the Zimbabwean population had active internet and data subscriptions in the last quarter of 2021, totalling 9.3 million users (POTRAZ, 2021). Furthermore, the mobile and data traffic increased by 10.4 percent, to 25,882 TB, by the end of 2021, meaning that more users are gaining access to the internet through their mobile phones for personal or business use (Techzim, 2022). According to Kemp (2022), the internet penetration rate at the beginning of 2022 was 30.6 percent of the total Zimbabwean population (15.21 million), of whom 4.65 million are active internet users. Social media platforms such as Facebook, Instagram, Twitter and LinkedIn were the most used in Zimbabwe, with 1.30 million users on Facebook, 407.7 thousand users on Instagram, 680 thousand users on LinkedIn and 232.4 thousand users on Twitter (Kemp, 2022).

The section below provides a brief background on Econet Wireless Zimbabwe, the market leader in the Zimbabwe telecommunications industry and the focal point of this study.

3. ECONET WIRELESS ZIMBABWE

Econet Wireless Zimbabwe, established on 10 July 1998, is Zimbabwe's largest telecommunications service provider and is also one of the largest companies on the Zimbabwe Stock Exchange in terms of market share (Econet Wireless Zimbabwe, 2022). Currently, Econet Wireless Zimbabwe is the market leader across all product segments, holding 69 percent of the market share in the telecommunications industry (Econet Wireless Zimbabwe, 2022). Econet Wireless Zimbabwe offers quality services, especially mobile network and internet services, in the telecommunications industry in Zimbabwe. Furthermore,

Econet Wireless Zimbabwe is regarded as the leading company in the telecommunications industry and has invested in telecommunications infrastructure, owning 80 percent of the mobile phone infrastructure in Zimbabwe (Barton, 2015; Econet Wireless Zimbabwe, 2018).

Econet Wireless Zimbabwe (2022) provides various communication solutions, such as Short Message Service (SMS), mobile calling, money transfer services, mobile money and mobile banking, as well as internet services, to name a few. Econet Wireless Zimbabwe was also one of the first telecommunications companies to start using digital marketing in Zimbabwe in order to communicate with its customers through various social media channels such as Facebook and Twitter (Econet Wireless Zimbabwe, 2022). For Econet Wireless Zimbabwe to become more effective in its social media marketing strategy, it is crucial to determine which social media marketing channels will deliver the best performance for a particular marketing purpose (Econet Wireless Zimbabwe, 2018, 2022).

4. SOCIAL MEDIA MARKETING

Stelzner (2016) states that social media marketing is a type of digital marketing that has changed the way in which businesses communicate with their customers and market their products, as well as the way in which business is conducted. Therefore, social media marketing has redefined digital marketing and, in the process, changed how marketing information is circulated (Yadav & Rahman, 2018). Because of social media marketing, businesses have the ability to communicate information about their products and services worldwide in real time (Yadav & Rahman, 2018). According to Pride and Ferrell (2017), social media marketing is a form of interaction that has transformed the way in which businesses relate to their customers.

Social media marketing is used to create direct relationships with existing customers and to reach potential new customers (Alalwan et al., 2017). Yadav and Rahman (2018) state that social media marketing is like a highway with multiple lanes that enables customers to say what they want about products and services when they want to. Econet Wireless Zimbabwe, for example, has different social media marketing channels whereby customers can voice their opinions about products. Social media marketing enables businesses to encourage customers to communicate on their websites, enabling them to provide instant product information and to attend to customers' questions, concerns and problems directly and quickly (Chaffey, 2018). According to Alalwan et al. (2017), social media marketing is a broad term that is used to describe software tools that enable the creation of user-generated content that can be shared. Chaffey (2018) notes that social media marketing represents a paradigm shift in marketing that enables transparent, trustworthy dialogues and builds relationships, in the presence of professional and user-generated content. According to Noone, McGuire and Rohlfs (2018), social media marketing is an internet tool that helps to facilitate interaction by allowing the continuous modification and exchange of content.

It can be noted from the above definitions that there is consensus among most of the authors that social media marketing is about interaction and the sharing of ideas and experiences through various online tools to educate customers about products or services that a business offers in a timely manner. Noone et al. (2018) state that social media marketing is a new way of communication where businesses are able to communicate directly with customers without going through intermediaries. Further, the successful incorporation of social media marketing in business operations could aid in increasing revenue (Ryan & Jones, 2016) since it is a low-cost marketing option. Many businesses use social media marketing to generate online word of mouth and to create relationships with their customers, thus enabling

them to extend their marketing efforts (Ismail, 2017). Customers spend much of their time on social media, which is why companies need to meet them there (Tuten & Solomon, 2017).

From this brief discussion, it is evident that social media marketing can be very beneficial to businesses if they plan and implement it effectively. The following discussion highlights a few of the benefits and risks of using social media marketing.

4.1. Benefits and Risks of Social Media Marketing

Social media marketing provides businesses with a lot of opportunities to reach their customers. The correct use of social media channels can improve the performance of a business drastically through effective engagement with customers and value creation (Trainor et al., 2015). The benefits of social media marketing include, but are not limited to, the following:

- Creates brand awareness/exposure: It helps to create brand awareness owing to the cost-efficient digital marketing methods that are used to increase the visibility of businesses (Chen & Lin, 2019). Econet Wireless Zimbabwe, has managed to increase the visibility of its brand for its "smart data" campaign through the use of social media channels.
- Promotes engagement with customers: It enables businesses to engage with customers in a direct and timely manner and at a low cost (Chaffey, 2018). Customers can visit Econet Wireless Zimbabwe's website and Facebook page for general or specific information on products or services.
- Increases sales: It can be used to increase the sales revenue of a business (Felix et al., 2017) if correct information about products or services is communicated timeously.
- Reduces costs: It does not require high advertising costs (Meikle, 2017). The moment that content is posted on social media channels, people will see it and potentially act on it in a positive way.
- Promotes networking with customers: Networking with customers enables businesses to communicate information about their products and services more accurately (Yadav & Rahman, 2018) and to get greater insight into customers' needs and wants, thereby building improved customer relationships (Chahal & Rani, 2017).
- Enhances value creation: Barnes (2018) states that the value that a business gains by using social media marketing cannot be ascertained, but the trust that a customer places in a business's product or service creates value for the business. Therefore, customers' comments on social media posts could benefit Econet Wireless Zimbabwe because it will get to know what customers say about its products and services. Businesses that focus on building trust among their customers grow faster than those who only advertise (Seo & Park, 2018).
- Promotes the gathering of customer information: According to Ryan and Jones (2016), businesses can obtain much more detailed customer information and become more aware of customers' interests by communicating on social media channels, which ultimately leads to building a better relationship with customers. Econet Wireless Zimbabwe, is building up customer profiles that contain information on customers' purchases, which will boost marketing efforts regarding the relevant products and services.
- Saves time: Product demonstrations can be done very effectively at any time on social media channels, thereby saving on travelling time, as well as saving on logistics and overall costs (Ryan & Jones, 2016). Econet Wireless Zimbabwe, has a

frequently asked questions (FAQs) section on its Facebook page where customers have 24/7 access to product information. Social media marketing also enables customers to provide instant feedback on products or services.

It is evident that social media marketing has a variety of benefits for both businesses and customers. However, if social media marketing is not managed well, it can have a negative impact on a business's image (Chen & Lin, 2019). Businesses can damage their reputation, as well as the reputation of their products or services, if they do not make an effort to learn how social media marketing works (Tuten & Solomon, 2017). Some of the risks associated with social media marketing are discussed below.

- Time intensive: It involves a lot of interaction and needs commitment. There must be a dedicated employee who monitors all the comments and questions that are asked by customers and who provides customers with instant feedback (Calder et al., 2019). If this is not done, a business may lose many customers (Calder et al., 2019).
- Risk: It has several risks associated with it, the biggest being cybercrime (Meyers, 2017). A person can hack into Econet Wireless Zimbabwe's database and send out damaging information on its social media channels. If such a crime is not dealt with immediately, a great deal of damage can be done to the business (Calder et al., 2019). All information that is shared via social media channels is viewed instantly by anyone who follows the business and, therefore, the business has no control over who views it.
- Negative feedback: It enables customers to become "marketers" who can, at any time, create negative feedback regarding products or services (Chen & Lin, 2019). An unhappy customer or a competitor can post an offensive comment or picture, which may damage the reputation of a business, and there is not much that a business can do to prevent these kinds of incidents (Chen & Lin, 2019).
- Slow return on investment: It is a long-term investment, and returns cannot be expected overnight (Meyers, 2017). It takes time for a business to build followers and for the followers to understand what the business is all about.

It is evident from the above discussion that social media marketing can be very fruitful for businesses if they plan and execute it properly and effectively. Social media marketing requires time and dedication for it to be beneficial to a business. Social media marketing has emerged as an innovation in the marketing field and is the future of communication.

5. RESEARCH METHODOLOGY

An exploratory research design that was qualitative in nature was adopted for the study. An exploratory research design was deemed appropriate for clarifying a concept, which, in this case, involved exploring the use of social media marketing in a telecommunications business in Zimbabwe, using Econet Wireless Zimbabwe as a case study. Further, an exploratory research design also made it possible to gain insight into how Econet Wireless Zimbabwe uses social media marketing. The investigation was conducted from a qualitative research perspective. Given the nature of the topic under investigation, qualitative research allowed the researcher to go deeper into the subject matter (Yin, 2017). Based on the research design and methods, a constructivist philosophical world view was adopted since the research concerned getting participants' views of the situation under study. The participants' views on certain topics differed, and the researcher therefore looked for complexity in the views instead of narrowing meanings down to a few ideas (Creswell & Creswell, 2018). According to a constructivist philosophical world view, knowledge is constructed from human experience, which contrasts with self-evident knowledge (Creswell & Creswell, 2018). In a constructivist

approach, subjective meanings are drawn from individual experiences. Therefore, the goal of the research was to rely on the participants' views of the situation being studied as much as possible. Open-ended questions were used, which allowed the participants to express their thoughts and feelings and provided rich data relevant to the study (Creswell & Creswell, 2018).

Owing to the exploratory nature of the study, non-probability judgement sampling was used. Non-probability sampling is less expensive and can usually be implemented quicker than probability sampling (Ruel, 2017). Judgement sampling was deemed appropriate for the study because it is widely used in qualitative research for identifying and selecting information-rich cases that will ensure the most effective usage of limited resources in order for the research question to be answered (Saunders et al., 2017). The researcher used her own judgment in selecting members of the population to take part in the study (Gneezy, 2017).

The population consisted of the entire marketing department (120 employees) of Econet Wireless Zimbabwe. The sample consisted of 20 employees in the marketing department of Econet Wireless Zimbabwe in Harare.

The sample was selected based on the following inclusion criteria:

- Employees must be older than 18 years and under 65 years.
- Employees must be part of the marketing department of Econet Wireless Zimbabwe in Harare.
- Employees should be able to speak, read and write in English.

Data were collected by means of a communicative technique, namely, interviews, specifically in-depth interviews. In-depth interviews were deemed appropriate for the collection of data because they generate first-hand information, deepen understanding and allow increased knowledge (Brotherton, 2015). All the interviews were recorded on a digital recorder with the participants' permission, after which the interviews were transcribed. Furthermore, a research diary was utilised to document the researcher's observations and personal reflections after each interview.

The participants were asked three open-ended questions that were derived from the research objectives. More questions were asked as the interviews progressed and more information was needed. The questions were as follows:

- How does Econet Wireless Zimbabwe use social media marketing?
- Why did Econet Wireless Zimbabwe decide to use social media marketing?
- Which social media channels does Econet Wireless Zimbabwe use the most?

The data were analysed by means of thematic analysis since the research was contextual in nature. Thematic analysis is a technique that is used to identify, analyse and report themes or patterns in greater detail (Braun & Clarke, 2016). Thematic analysis was used because it shows patterns in data that can be grouped into meaningful themes (Braun & Clarke, 2016).

6. RESEARCH FINDINGS

The outcomes of the questions asked were examined in terms of three main themes and their underlying categories, as outlined by Tesch's model (thematic analysis).

6.1. Theme 1: Econet Wireless Zimbabwe's use of social media marketing

Theme 1 is in line with the first secondary objective of this study, namely: "To explore how Econet Wireless Zimbabwe uses social media marketing." The participants acknowledged that Econet Wireless Zimbabwe uses social media marketing for purposes of

engaging with customers, informing customers, improving its brand visibility and tracking how many people use its products. The participants highlighted that information about any changes that may affect the business and its customers can now be exchanged in a faster way. They also emphasised brand visibility, indicating that Econet Wireless Zimbabwe is concerned about how it is viewed and how many customers are aware of the brand. Econet Wireless Zimbabwe also makes customers part of its brand building since they are the ones who use its products and services.

Four categories emerged from the first theme and are explained below.

6.1.1. Category 1: Informing customers

Most participants highlighted that customers are always informed about upcoming changes that may affect the way business is done and that customers are kept up to date with what is on offer. The following direct quotations from the in-depth interviews with participants confirm the findings regarding category 1:

- "... our customers are always well informed about upcoming changes that may affect the way business is done ..."
- "... getting in touch with our customers and informing them about what we are currently offering is what we best …"
- "… we always use social media marketing to inform our customers about what we are offering …"

6.1.2. Category 2: Improving brand visibility

In the in-depth interviews the participants highlighted that Econet Wireless Zimbabwe uses social media marketing to improve its brand visibility. The participants also acknowledged that Econet Wireless Zimbabwe is very much concerned about how customers view its brand and how many people are aware of the brand. The following direct quotations from the in-depth interviews with participants confirm the findings regarding category 2:

- "… we use social media marketing to build our brand and we create captive and professional visuals that really represent our brand …"
- "… and we also build brand awareness through creating online presence that shows how Econet Wireless Zimbabwe Limited is doing …"
- "… we build brand awareness by using targeted influencers on our social media platforms to market our products for us."

6.1.3. Category 3: Tracking the number of customers

Most participants acknowledged that Econet Wireless Zimbabwe tracks how many customers use its social media marketing channels. Participants further indicated that tracking customers is a way by which the business can find out how many customers know about its products and services. The following direct quotations were selected from the responses of the interviewed participants:

- "… I track the number of people who are interested in our brands through their activity on our social media channels."
- "… we track the number of people using our products and services through our social media channels."
- "… the number of people who have visited our social media pages are tracked."

6.1.4. Category 4: Promoting customer engagement

The participants expressed the view that customer engagement is important since the products and services are there for the customers to enjoy. They further highlighted that customer engagement helps the company to understand what the customers want. Below are direct quotations selected from the responses of the interviewed participants.

- "… social media marketing is used to engage our customers in what we do."
- "… we use a lot of videos to keep our customers engaged."
- "… the reason why customers are receptive to our brands is because social media marketing helps us to engage with our customer."

6.2. Theme 2: Reasons why Econet Wireless Zimbabwe uses social media marketing

The second theme identified from the in-depth interviews is in line with the second secondary objective of this study, namely: "To examine the reasons behind Econet Wireless Zimbabwe's usage of social media marketing." The participants highlighted that social media marketing is used because it is less expensive than other forms of conventional marketing and reaches a large number of potential and existing customers. The participants also mentioned that customers can be reached at any time, making social media marketing an effective and easy way to communicate and to reach many customers.

Most participants indicated that Econet Wireless Zimbabwe uses social media marketing because it is an inexpensive way to promote the business, reaches a large number of people, aids in sales, facilitates two-way communication and provides a means of communicating new offerings.

Three categories were identified from theme two. These categories are explained below.

6.2.1. Category 1: An inexpensive way to promote the business

The participants highlighted that Econet Wireless Zimbabwe wants to reach as many people as possible while minimising costs. They indicated that using social media platforms to promote Econet Wireless Zimbabwe is inexpensive. The following direct quotations shed light on participants' views in this regard:

- "… social media marketing is an inexpensive way to promote our business as it helps us to distribute content, this is why we chose to use social media marketing."
- "… marketing costs are cut through using social media marketing as social media marketing is less expensive than the traditional way of marketing."
- "… it is inexpensive to market using social media marketing as we reach a lot of customers at a low cost."

6.2.2. Category 2: Reaches a large number of people

The participants highlighted that Econet Wireless Zimbabwe would want to reach as many customers as possible. Econet Wireless Zimbabwe uses social media marketing, mainly because a lot of people do business on social media platforms. Interestingly, most of the participants said that, through social media marketing, Econet Wireless Zimbabwe has managed to reach customers in areas in which its products were not common previously. Below are direct quotations from the interviewed participants.

- "… we want to reach customers both locally and abroad, so this is why we use social media marketing."
- "… social media marketing has given us access to areas that were not reachable when we were only using the traditional marketing tools. We can now reach areas that we could not because of social media marketing, this is why we decided to use it."
- "… we wanted to have a global reach and to increase our brand visibility and social media marketing helps us to reach these customers."

6.2.3. Category 3: Provides two-way communication

The participants said for any business to go forward, there is a need for two-way communication since feedback from customers is very important. They highlighted that Econet Wireless has been able to improve its services because of such two-way communication. The following direct quotations were taken from the in-depth interviews:

- "… two-way communication is achieved through social media marketing; the customer gets to send feedback and ask questions where they need clarity on our social media channels."
- "… when it comes to social media marketing there is two-way communication as we are able to give feedback timeously. A customer can just make an enquiry and we can respond to that question on our social media channels."

6.3. Theme 3: Social media channels mostly used by Econet Wireless Zimbabwe

The third theme identified from the in-depth interviews is in line with the third secondary objective of the study, namely: "To determine which social media channels Econet Wireless Zimbabwe uses the most." All the participants indicated that their department uses social media channels. The participants indicated that Facebook and Twitter are used as part of their department's strategy for social media marketing. It was evident from the in-depth interviews that Facebook and Twitter are the main social media marketing channels at Econet Wireless Zimbabwe. LinkedIn, blogs and YouTube are also used, but not as much as Twitter and Facebook.

Six categories emerged from theme three. These categories are discussed below.

6.3.1. Category 1: Twitter

The participants indicated that Econet Wireless Zimbabwe uses Twitter to reach people all over Zimbabwe and to interact with customers, which has made the products and services it offers well known. Below are direct quotations that illustrate the participants' views:

- "… Twitter is one of the most used social media platforms."
- "… Facebook and Twitter mainly are used."
- "… at the moment Facebook, and Twitter are used more by our customers."
- "… Twitter, Facebook, YouTube are the most used social media platforms for interacting with clients."
- "… we use Twitter to enable customer engagement."
- "… Twitter is one of the main social media platforms we use."

6.3.2. Category 2: Facebook

The participants highlighted that Econet Wireless Zimbabwe mainly uses Facebook since most of its customers are on Facebook. The participants indicated that the company uses Facebook to introduce new products and to interact with both potential and existing customers. Below are direct quotations taken from the in-depth interviews that illustrate the participants' views concerning the use of Facebook:

- "… generally, we mainly use Facebook. We have realised that most of our following is on Facebook."
- "… we do use other social media platforms, but Facebook is the one we mostly use."
- "… Facebook is one of the most used channels at Econet Wireless Zimbabwe Limited because most of our followers are no Facebook."

6.3.3. Category 3: Instagram

A few of the participants highlighted that Econet Wireless Zimbabwe also uses Instagram, although it is not as popular as Facebook and Twitter. They also said that the hashtags used on Instagram have helped the Econet Wireless Zimbabwe brand to be more visible than before. Below are two direct quotations regarding the use of Instagram:

- "… This will encourage your followers to learn more about your business and push them to visit your website."
- "… using hashtags helps us to increase interaction with our followers because they help our business to be recognised easily. The hashtags we use on Instagram has helped increase our brand visibility."

6.3.4. Category 4: LinkedIn

The participants indicated that LinkedIn allows Econet Wireless Zimbabwe to share content and opinions. They explained that LinkedIn helps the business to build relationships with potential customers and partners. Below are direct quotations taken from the in-depth interviews that illustrate the participants' views on the use of LinkedIn:

- ".. not only does it allow us as a business to share opinions and content on relevant topics, it also allows us to interact with professionals and this is why we use it."
- "… we use LinkedIn for launching new products as I see it as one of the best for launching a new product."
- "… LinkedIn provides us with an opportunity to connect with other businesses and professionals who are in the same industry as us and we have gained knowledge and their unique experiences through interacting with them and seeing what they post on LinkedIn."

6.3.5. Category 5: Blogs

The participants indicated that blogs allow readers to comment and to have conversations with the bloggers and anyone else who reads the blogs. They highlighted that consumers can get to know the Econet Wireless Zimbabwe brand through blogs and may end up buying the services and products that are offered by Econet Wireless Zimbabwe. The following direct quotations from participants relate to the use of blogs:

- "… blogs provide us with an opportunity to connect with our existing and potential customers in a way that is different, more conversational way, this is why we use blogs."
- "… we always want to allow for conversations as this helps us to relate well with our customers. Blogs allow for conversations and we get to interact with the customers and they get to know more about our brand."

6.3.6. Category 6: YouTube

The participants explained that YouTube is designed for sharing videos that anyone can watch and it offers a way for Econet Wireless Zimbabwe to reach potential customers. Econet Wireless Zimbabwe has created its own YouTube channel. This channel is used for posting advertisements and other marketing videos to help sell the brand to everyone. The following direct quotations regarding the use of YouTube were taken from the in-depth interviews:

- "… we are so proficient in our business and YouTube gives you a chance to show how we do things."
- "… YouTube has the benefit of visual content."
- "… YouTube is an easy way to build credibility for the services or products that Econet Wireless Zimbabwe Limited offers. Customers trust businesses' video content more because through videos they can actually see the products in action unlike just reading a flier."

7. DISCUSSION AND CONCLUSION

From the above discussion it is evident that Econet Wireless Zimbabwe uses social media marketing in many ways, such as informing customers about its products and services, improving the visibility of its brand and increasing customer engagement. This finding is in line with Seo and Park's (2018) assertion that social media marketing can improve the performance of a business drastically through engagement with customers and value creation. Marketers are engaged by Econet Wireless Zimbabwe to ensure that they also take part in building the brand since they also use the products and services offered by Econet Wireless Zimbabwe. It is also evident that social media marketing has linkages to Econet Wireless Zimbabwe's brand and market share and has seen the business expanding in respect of the products and services it provides. The findings show that social media marketing plays a significant role in relationship creation between Econet Wireless Zimbabwe and its existing and potential customers. These findings are in line with Calder et al. (2019) assertion that many businesses use social media marketing to create relationships with their customers and to generate online word of mouth.

Further, Econet Wireless Zimbabwe uses social media marketing to connect with its customers effectively and efficiently and to create and increase brand awareness among its current and potential customers. Econet Wireless Zimbabwe uses social media marketing because it allows it to inform its customers of new services and products and to engage the customers in activities, such as events and new product launches. This finding is in line with Seo and Park's (2018) assertion that businesses use social media marketing to share information about their products and services quickly and efficiently, and that social media marketing enables customers to give feedback to businesses and businesses to engage in discussions with the community. If a business does not engage with its customers, it will not be successful in social media marketing. In this regard, Meikle (2017) notes that businesses

should use social media marketing because it allows them to engage with their customers, to create two-way communication with their customers and to inform their customers about products and services. Social media marketing also aids in strengthening the corporate identity of a business, building confidence for the business and creating relationships.

According to Kaur et al. (2018), it is important that businesses determine which social media channels are the most popular among their customers by looking at the number of likes, followers, views and comments and the amount of feedback received. From the in-depth interviews that were conducted, it can be deduced that Facebook and Twitter are the social media channels that are used the most by Econet Wireless Zimbabwe and that the company has obtained a competitive edge over its competitors because it has managed to adapt to the preferences of its customers in a short space of time. Econet Wireless Zimbabwe also makes use of YouTube. The company has created a YouTube channel where it shares marketing-related videos about its products and services that anyone can watch, which is part of its strategy to reach potential customers. These findings are in line with Chen and Lin's (2019) assertion that customers make purchase decisions on the basis of YouTube reviews since they want information that is easy to understand.

In conclusion, this study makes a contribution to the telecommunications industry by providing an integrated picture of the use of social media marketing in the telecommunications industry of Zimbabwe, using Econet Wireless Zimbabwe as a case study. The participants perceived social media marketing usage as important in the telecommunications industry and as an area that should not be ignored. The findings of the research confirm the notion, as expressed in the literature, that social media marketing has changed the way in which business is done, how businesses communicate with their customers and how businesses market their products (Tuten & Solomon, 2017).

REFERENCES

Alalwan, A. A., Rana, N., Dwivedi, Y., & Algharabat, R. (2017). Social media in marketing: A review and analysis of the existing literature. Telematics and Informatics, 34(7), 1117–1190.

Barnes, N.G. (2018). Tweeting and blogging to the top. Marketing Research, 22(1), 8-13.

Barton, J. (2015). Econet hits out at government network sharing proposal in Zimbabwe. [Internet] Accessed 19 October 2022. Available from: https://developingtelecoms.com/telecom-business/operator-news/5777-econet-hits-out-at-government-network-sharing-proposal-in-zimbabwe.html

Braun, V., & Clarke, V. (2016). (Mis) conceptualising themes, thematic analysis, and other problems with Fugard and Potts' sample-size tool for thematic analysis. International Journal of Social Research Methodology, (6), 739–743.

Brotherton, B. (2015). Researching Hospitality and Tourism. 2nd ed. London: Sage Publications.

Calder, B. J., Malthouse, E. C., & Schaedel, U. (2019). An experimental study of the relationship between online engagement and advertising effectiveness. Journal of Interactive Marketing, 23(4), 321–331.

Chaffey, D. (2018). Global social media research. Summary 2018. [Internet] Accessed 24 December 2019. Available from: https://www.smartinsights.com/social-media-marketing/social-media- strategy/newglobal-social-media-research/

Chahal, H., & Rani, A. (2017). How trust moderates social media engagement and brand equity. Journal of Research in Interactive Marketing, 11(3), 312–335.

Chen, S. C., & Lin, C. P. (2019). Understanding the effect of social media marketing activities: The mediation of social identification, perceived value, and satisfaction. Technological Forecasting and Social Change, 140, 22–32.

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative and mixed method approaches. 5th ed. United States of America: SAGE Publication.

Econet Wireless Zimbabwe. (2018). Integrated Annual Report 2018. [Internet] Accessed 11 February 2019. Available from: http://ewzinvestor.co.zw/annual-reports/.

Econet Wireless Zimbabwe. (2022). 3 Reasons to Consider Investing in Econet Wireless Zimbabwe. [Internet] Accessed 19 October 2022. Available from: https://ewzinvestor.com/.

Felix, R., Rauschnabel, P., & Hinsch, C. (2017). Elements of strategic social media marketing: A holistic framework. Journal of Business Research, 70, 118–126.

Global Monitor. (2020). Zimbabwe Telecommunication Market Report (2020-2025). [Internet] Accessed 19 October 2022. Available from: https://www.globalmonitor.us/product/zimbabwe-telecommunication-market-report

Gneezy, A. (2017). Field experimentation in marketing research. Journal of Marketing Research 54, (1), 140–3.

Ismail, A. R. (2017). The influence of perceived social media marketing activities on brand loyalty: The mediation effect of brand and value consciousness. Asia Pacific Journal of Marketing and Logistics, 29(1), 129–144.

Kaur, P., Sharma, S., Kaur, J., & Sharma, S. K. (2018). Using social media for employer branding and talent management: An experiential study. IUP Journal of Brand Management, 12(2), 7-20.

Kemp, S. (2022). Digital 2022: Zimbabwe. [Internet] Accessed 20 October 2022. Available from: https://datareportal.com/reports/digital-2022-zimbabwe.

Lancaster, H. (2022). Zimbabwe Telecoms Market Report Telecoms, Mobile and Broadband - Statistics and Analyses. [Internet] Accessed 20 October 2022. Available from: https://www.budde.com.au/Research/Zimbabwe-Telecoms-Mobile-and-Broadband-Statistics-and-Analyses.

Madziwa, C., & Sibanda, V. (2018). An analysis of the impact of social media in the financial services sector in Zimbabwe. International Journal of Economics, Commerce and Management: A customer perspective, VI (2), 248-273.

Mehelmi, H.E., & Sadek, H. (2019). Investigating the usage of social customer relationship management and its impact on firm performance in the mobile telecommunication services: Egypt case. The Journal of Business and Retail Management Research, 13 (3).

Meikle, G. (2017). Social media: Communication, sharing and visibility. New York, NY: Routledge.

Meyers, C. B. (2017). Social media influencers: A lesson plan for teaching digital advertising media literacy. Advertising and Society Quarterly, 18(2), 1–31.

Mugwara, T. (2020). Feature: Zimbabwean businesses embrace social media marketing to boost sales amid pandemic. [Internet] Accessed 20 October 2022. Available from: http://www.xinhuanet.com/english/2020-10/21/c_139456815.htm.

Noone, B. M., McGuire, K. A., & Rohlfs, K. V. (2018). Social media meets hotel revenue: Opportunities, issues and unanswered questions. Journal of Revenue and Pricing Management, 10 (4), 293-305.

POTRAZ. (2017). Sector performance report. [Internet] Accessed 18 September 2017. Available from: http://www.techzim.co.zw/.../POTRAZ-Sector-Performance-Report-4th-Quarter.

POTRAZ. (2021). Sector performance report. [Internet] Accessed 19 October 2022. Available from: https://www.techzim.co.zw/wp-content/uploads/2021/12/Abridged-Sector-Performance-Report-Q3-2021-HMed.pdf.

Pride, W.M. & Ferrell, O.C. (2017). Marketing. 16th ed. Ohio: South-Western, Cengage Learning.

Research and Markets. (2020). Zimbabwe - Telecoms, Mobile and Broadband - Statistics and Analyses. [Internet] Accessed 20 October 2022. Available from: https://www.researchandmarkets.com/reports/4770996/zimbabwe-telecoms-mobile-and-broadband.

Ruel, S. (2017). Qualitative methods in business research. Qualitative Research in Organizations and Management. An International Journal, 12, 87-88.

Ryan, D & Jones, C. (2016). Understanding digital marketing: Marketing strategies for engaging the digital generation. London: Kogan Page.

Saunders, M., Lewis, P. & Thornhill, A. (2017). Research Methods for Business Students. 8th edition. Pearson Education Limited.

Seo, E.J., & Park, J.W. (2018). A study on the effects of social media marketing activities on brand equity and customer response in the airline industry. Journal of Air Transport Management, 66, 36–41.

Stelzner, M. (201). The 2016 Social Media Marketing Industry Report: Social Media Examiner. [Internet] Accessed 20 October 2022. Available from: http://www.socialmediaexaminer.com/SocialMediaMarketingReport2016.pdf.

Techzim. (2022). Zimbabwe Telecoms Reports by POTRAZ. [Internet] Accessed 19 October 2022. Available from: https://www.techzim.co.zw/wp-content/uploads/2021/12/Abridged-Sector-Performance-Report-Q3-2021-HMed.pdf.

Trainor, K.J., Rapp, A., Beitelspacher, L.S., & Schillewaert, N. (2011). Integrating information technology and marketing: An examination of the drivers and outcomes of e-marketing capability. Industrial Marketing Management, 40(1), 162-174.

Tuten, T. L., & Solomon, M. (2017). Social media marketing. London: Sage Publications Ltd.

Yadav, M., & Rahman, Z. (2018). The influence of social media marketing activities on customer loyalty: A study of e-commerce industry. Benchmarking: An International Journal, 25(9), 3882–3905.

Yin, R. K. (2017). Case study research and application: Design and Methods. New York, NY: Sage Publications.

Volume XIX, Issue (1) (2023) 123-132

International May Conference on Strategic Management

CONTRIBUTION TO THE ASSESSMENT OF RISK FACTORS ASSOCIATED WITH THE SUPPLY CHAIN: THE CASE OF ETRAG COMPANY, CONSTANTINE, ALGERIA

Saker Besma*, Kelilba Mounira, Chaib Rachid

Laboratory of Transportation Engineering and Environment, University of Mentouri Brothers, Algeria

Abstract: In view of today's increasing competition, all competing companies globally have implemented innovative practices in their supply chains to achieve the desired goals by increasing revenues and reducing costs. However, contrary to prevailing belief and hypotheses, supply chains have become longer and more complex, even affected by expected or unexpected events that threaten their profitability and continuity. It is therefore essential that companies take these risk events seriously. From now on, actions to identify and assess potential risk factors are required to ensure the continuity of all supply operations, which is the objective of our work. Thus, the results obtained enable the stakeholders to refocus on the critical risk factors that must be resolved as a priority in order to continue the company's development. As a case study, we took the Public Economic Company of Agricultural Tractors (ETRAG) located in Constantine, Algeria.

Keywords: supply chain, risk identification and assessment, matrix, criticality.

1. INTRODUCTION

In view of today's increasing competition, all competing companies globally have implemented innovative practices in their supply chains to achieve the desired goals by increasing revenues and reducing costs. However, contrary to the prevailing belief and hypotheses, supply chains have become longer and more complex, more disruptive, and more fragile in recent years, leading to an increase in the likelihood of disruptions experiencing detrimental in the supply chain (Zhao et al., 2013). The supply chain consists of different groups of partners in different interfaces: external suppliers, service providers, and customers. In this long-term environment, the supply chain is greatly exposed to a range of expected or unexpected events (Hahn & Heinrich, 2012). These events are a threat to the company's profitability and continuity. Moreover, companies increasingly face higher risks in terms of supply interruptions, manufacturing processes, delivery delays, etc., often resulting in loss of reputation and poor financial performance of supply chain partners (Sreedevi & Saranga, 2017). In addition, outsourcing leads to lower inventory levels which make the supply chain more vulnerable (Wu et al., 2011). Under these circumstances, supply chain risk management is now a necessary and essential in supply chains in order to maintain business sustainability and develop a competitive advantage that can be done only by identifying and assessing risks

* *Corresponding author: sakerbesma92@gmail.com*

to give a comprehensive view of the company's situation. As a case study, we have taken the Public Economic Company of Agricultural Tractors (ETRAG) located in Constantine, Algeria. The latter (ETRAG) is considered one of the achievements in the industrial field of the seventies in Algeria (Figure 1). With the following objectives: (1) meeting the growing needs of the national market for agricultural tractors and spare parts; and (2) contributing to the mechanization of national agriculture.

Figure 1. Overview of some ETRAG activities (the company documentation)

This article aims to give a comprehensive view of the risks linked to the tractor supply chain. This experimental research is a qualitative data that enables the collection of information in order to give a comprehensive view of supply chain risks in this company. The work carried out is based on the distribution of a questionnaire to stakeholders. The objective of such a survey is to identify and analyze the risk factors having a negative influence on the progress of the activities characterizing the supply chain in order to build a strategy and select the current modes of action. The rest of this article is structured as follows: Section 2 presents a review of the literature on supply chain risk management, the methodology used in Section 3 is then discussed, Section 4 presents the search results, in Section 5, the analysis of the results, and finally the conclusion is presented.

2. LITERATURE REVIEW

Studies have long identified supply chain risk management (SCRM) as a key element in business performance; SCRM aims to improve the production process, and consumer satisfaction, enhancing business performance (Kache & Seuring, 2014). Supply chain risk management is described to include the identification, analysis, and assessment of losses that can occur in companies (Manuj & Mentzer, 2008) .While Tang (2006) emphasizes the basic requirements for cooperation and coordination among all supply chain partners. Baryannis et al. (2019) proposed comprehensive compilations of SCRM definitions as follows: identify, assess, mitigate, and monitor risks to reduce vulnerability and increase supply chain strength through a collaborative effort among supply chain partners.

Regarding risk, there is still no consensus or agreement on the definition of risk. Researchers provided different descriptions of (risk). Abdel-Basset et al. (2019) defines risk as an event that leads to a negative impact, also defined as a potential event that may lead to a certain loss or have an impact on the achievement of specific objectives.

Supply chain risk (SCR) is defined as «a variation in the distribution of possible supply chain outcomes, their likelihood, and their subjective values (Jüttner et al., 2003). For Lavastre and Spalanzani (2010) risk is "therefore a break in the flow between the elements that make up the supply chain, this potential variability can thus affect the flow of information, materials and products and can change the use of resources (human and equipment)."

Disruptions in the supply chain are a major concern for organizations and have a major impact on the operational and financial performance of a company. Disruptions can appear in different forms, including supplier shutdowns, and production stoppages at manufacturing firms (Ponomarov & Holcomb, 2009). The negative effects of the disruptions have prompted most researchers and business owners to seek to make the supply chain more robust and efficient in dealing with disruptions (Saker & Chaib, 2022). To attain this goal, companies must identify, assess, and categorize supply chain risks to reduce vulnerability and plan for unexpected disruptions.

Table 1. Classification of supply chain risks from literature

Supply chain risks categories	Risk Factor	Source
Supply Side Risks	-Supplier failure	(Yang & Li, 2010) (Ali & Shukran, 2016)
	-Supplier quality problem	
	-Purchase price increase	
	-Supply delay	
	-Non-compliance with requirements by suppliers	
	-Capacity shortage in the supply market	
	-Dependence on a single supplier	
Demand Side Risks	-Forecasts error	(Saker et al., 2021) (Tummala & Schoenherr, 2011)
	-Delay in product delivery	
	-Uncertainty in the product market due to the availability of competing products	
Process Risks	- Machine breakdown	(Samvedi et al., 2013) (Chen, 2018) (Tummala & Schoenherr, 2011)
	-Breakdown of IT System	
	-Lack of skilled labor	
	-Labor strikes in the company	
	-Accident	
Environmental Risks	-Custom clearances	(Tummala & Schoenherr, 2011) (Ali & Shukran, 2016) (Blackhurst et al., 2008)
	-Natural disasters	
	-Pandemics	
Financial Risks	-Difficulty in obtaining funding from financial institutions	(Tummala & Schoenherr, 2011) (Mangla et al., 2015) (Chand et al., 2017)
	-Financial instability due by exchange rates fluctuation	
	-Delay in sourcing debts from customer	

There are no universally accepted classifications of the potential risks encountered by supply chains. In an attempt to distinguish supply chain risks, researchers wanted to propose several classifications and models depending on their characteristics and locations. One of the

most common classification attempts in SCRM literature is to divide risk into three classifications. The first classification involves the internal risks of the focal company (Christopher & Peck, 2004; Rao & Goldsby, 2009), which are called organizational and operational risks (Ho et al., 2015). The second classification involves risks within the supply chain, but outside the company which can be considered demand and supply risks (Christopher & Peck, 2004; Rao & Goldsby, 2009). The authors Christopher and Peck (2004) add the third classification of risk outside the supply chain, which is usually outside the company's control and called environmental risk (Jüttner, 2005; Rao & Goldsby, 2009). According to this small passage about patterns and classifications related to supply chain risk and based on another comprehensive review of literature, we position ourselves for this study in five categories, these include: supply risks, demand risks, process risks, environmental risks, and financial risks, detailed in Table 1.

The next section, we start the empirical part of our research by describing the research methodology. The results of our questionnaire survey are examined, and risk factors linked into five categories: supply, demand, process, environment, and financial, are assessed. In the end, a conclusion is provided.

3. METHODOLOGY

This experimental research uses a qualitative method to examine research questions in order to give an overview of supply chain risks. The case study is designed for a complex and exploratory phenomenon that needs a comprehensive understanding (Yin, 2009). It is clear that a case study could use several methods of gathering information. So, the results of this experimental research come from his launch of a questionnaire. The questionnaire is based on the components of the five sides of supply chain risk factors identified in the preceding section.

In this work, the questionnaire was used to determine the weight of risk factors. A five-point Likert scale remains used to measure both the probability of occurrence and the degree of impact for each of the risk factors (Saker et al., 2021). Sources that better understand the company's supply chain were asked to indicate in the questionnaire the probability of occurrence of each factor risk from (Unlikely to always) and the degree of gravity from (Negligible to Critical). Once we have the degree of probability (Pi) and gravity (Gi) for each risk factor, the criticality level (Ci) is determined by using equation (1) as suggested by Dani (2009).

$$Ci = Pi \times Gi \quad (1)$$

		Probability				
		Frequent	*Likely*	*Occasional*	*Seldom*	*Unlikely*
Impact	Critical	Extremely high	Extremely high	High	High	Medium
	Serious	Extremely high	High	High	Medium	Medium
	Moderate	High	Medium	Medium	Medium	Low
	Minor	Medium	Medium	Medium	Low	Low
	Negligible	Medium	Low	Low	Low	Low

Figure 2. Risk impact and probability matrix (Engelhardt-Nowitzki & Zsifkovits, 2006)

Once you identify the probability and impact of risk factor, we will implement a tool of assessment .The risk matrix is constructed using the matrix of the authors Engelhardt-Nowitzki and Zsifkovits (2006) described in Figure 1. A criticality diagram was also used to assess the risk factors on each side.

4. RESULTS

4.1. Probability/ impact Analysis

We highlighted the probability of occurrence and impact of all risk factors. Table 2 presents indicators for each stage. To evaluate the risk factors' probability and impact, we conducted a comparative study between risk factor individuals' attributes and the group averages shown in Table 3.

Table 2. Risk factors probability and impact values

	Code	Risk factors	Probability	Impact
Supply Risk	SR1	Supplier failure	2	3
	SR2	Supplier quality problem	**3**	**4**
	SR3	Supply delay	**3**	**4**
	SR4	Purchase price increase	**3**	**4**
	SR5	Non-compliance with the requirements by suppliers	2	**4**
	SR6	Capacity shortage in the supply market	2	**4**
	SR7	Dependence on a single supplier	2	**4**
Demand Risk	DR1	Forecasts error	3	4
	DR2	Delay in product delivery	2	4
	DR3	Uncertainty in the product market due to the availability of competing products	**4**	**5**
Process Risk	PR1	Machine breakdown	**3**	**4**
	PR2	Breakdown of IT System	2	**4**
	PR3	Lack of skilled labor	**3**	**4**
	PR4	Labor strikes in the company	2	**4**
	PR5	Accident	**3**	**4**
	PR6	Labor disputes	**2**	**3**
Environmental Risk	ER1	Custom clearances	2	3
	ER2	Natural disasters	1	**5**
	ER3	Pandemics	**3**	4
Financial Risk	FR1	Difficulty in obtaining funding from financial institutions,	2	**4**
	FR2	Financial instability due to exchange rates fluctuation	**3**	3
	FR3	Delay in sourcing debts from customer	**3**	**4**

First, on the supply side, supplier quality problems, supply delays, and purchase price increases achieve notable values both in probability and impact. The three risk factors and non-compliance with the requirements by suppliers, capacity shortage in the supply market, and dependence on a single supplier gain great impact values.

Second, the demand side, the factor of uncertainty in the product market due to the availability of competing products, records above-average values for both the probability and impact of their group, while the forecast error factor has an equal value to the average probability value.

Third, concerning the process side, the factors of a machine breakdown, lack of skilled labor, and accident achieve notable values in terms of probability. The three risk factors, and Breakdown of IT System, have, on their part, recorded impact values higher than their group average.

Fourth, on the environmental side, pandemics have a value exceeding the probability average of their group. While natural disasters are gaining a significant impact value in their group.

Finally, concerning the financial side, delays in sourcing debts from customers achieve a notable probability value. This factor, along with the difficulty in obtaining funding from financial institutions, has an impact exceeding the average in their group. As for financial instability due to exchange rate fluctuations, it has a value exceeding the probability average.

Table 3. Averages of probability and impact in SCR categories

SCR categories	Probability	Impact
Supply Risk	2.42	3.85
Demand Risk	3	4.33
Process Risk	2.5	3.83
Environment Risk	2	4
Financial Risk	2.67	3.67

4.2. SCR Matrix probability/ impact

In order to identify that risk factor that has a critical potential and impact on the supply chain, all potential risk factors facing the ETRAG supply chain are represented in the probability and impact matrix. Figure 3 demonstrates the results of probability and impact on the supply side, demand side, process side, environmental side, and financial side.

		Probability				
		Frequent	**Likely**	**Occasional**	**Seldom**	**Unlikely**
Impact	**Critical**		DR3			ER2
	Serious			SR2 SR4 SR3DR1 PR1 PR3 PR5 ER3 FR3	SR5 SR6 SR7 DR2 PR2 PR4 FR1	
	Moderate			FR2	PR6 ER1 SR1	
	Minor					
	Negligible					

Figure 3. Supply chain risk matrix for ETRAG Company.

The risk matrix provides an overview of the risk factors analyzed in the study. The figure shows that there are significant differences in terms of risk factors. Uncertainty in the product market due to the availability of competing products (DR3) should be considered one of the most probable and grave risk factors "extremely high-risk levels".

While supplier quality problems (SR2), supply delays (SR3), purchase price increases (SR4), forecasts errors (DR1), machine breakdown (PR1), lack of skilled labor (PR3), accidents (PR5), pandemics (ER3), and delays in sourcing debts from customers (FR3) are classified as "High-risk levels".

As for non-compliance with the requirements by suppliers (SR5), a capacity shortage in the supply market (SR6), dependence on a single supplier (SR7), delay in product delivery (DR2), breakdown of IT System (PR2), labor strikes in the company (PR4), difficulty in obtaining funding from financial institutions (FR1), financial instability due to exchange rates fluctuation (FR2), labor disputes(PR6), custom clearances(ER1), supplier failure(SR1), natural disasters(ER2), are classified as "Medium Risk Level".

4.3. Risk factors Criticality Levels

In order to confirm the results previously obtained, we used the criticality for each risk factor. Figure 4 presents the hierarchy of criticality levels for risk factors in a supply chain in Tractor Company.

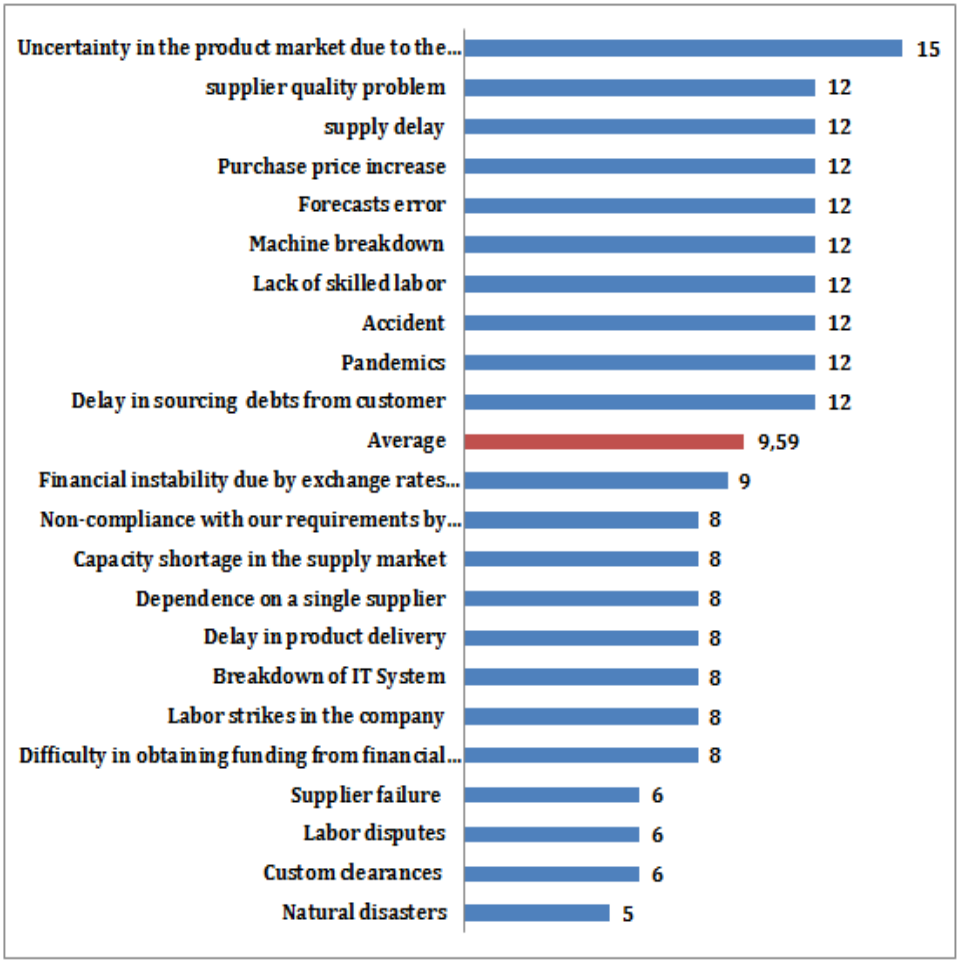


Figure 4. Risk factors by level of criticality

Ten (10) risk factors can be considered critical, exceeding the average value of 9.59 on the demand side: Uncertainty in the product market due to the availability of competing products (DR3) and forecast error (DR1). On the supply side, one finds supplier quality problems (SR2), supply delays (SR3), and purchase price increases (SR4). In terms of the

process side, one finds machine breakdown (PR1), lack of skilled labor (PR3), and accidents (PR5). On the environmental side, one finds pandemics (ER3). In terms of the financial side, one finds a delay in sourcing debts from customers (FR3).

In addition, we find financial instability due to exchange rate fluctuations (FR2) is close to the average with a value of (9), while non-compliance with our requirements by suppliers (SR5), capacity shortage in the supply market (SR6), dependence on a single supplier (SR7), delay in product delivery (DR2), breakdown of IT system (PR2), labor strikes in the company (PR4), and difficulty in obtaining funding from financial institutions (FR2) are at a medium criticality level (value of 8). In addition, supplier failure (SR1), labor disputes (PR6), custom clearances (ER1) with the same value of 6, and natural disasters (ER2) with a value of (5), have the lowest criticality levels. These results are close to our previous analysis of the probability-impact matrix.

5. DISCUSSION

To discuss the main findings of this research. First of all, we need to remind you that the Tractor Foundation has been and continues to be the source of pride for Algeria's industries. On the other hand, the tractor and spare parts industry focuses mainly on production, but the share of raw materials in growth.

These elements may explain the fact that the majority of risk factors have a low to occasional likelihood of occurrence but are estimated to be moderate, serious, or critical. For example, uncertainty in the product market due to the availability of competing products is the most dangerous. This severity may arise as a result of changing consumer trends and the availability of competing products. On the other hand, Supplier quality problem is considered the most serious. Also, supply delay, the distance between suppliers can be a source of delay. Because most raw materials are imported, it will affect and disrupt the tractor market. This severity may arise from the company's dependence on global suppliers. Otherwise, the increase in material prices (supply side) is estimated to be critical compared to the sale price.

On the other hand, machine breakdowns are a serious risk factor from the point of view that obsolescence of equipment is the most important cause of breakdowns. Similarly, a lack of skilled labor is not allowed despite the medium likelihood of occurrence, but this incident is considered to be serious. Similarly, accidents and epidemics are high-risk factors from the point of view; epidemics affect the company's activity and result in a shortage of inventory as a result of the closure of ports, where most raw materials are imported.

Otherwise, delays in obtaining debts from the client are critical because they cause financial difficulties for the company. On the other hand, financial instability due to exchange rate fluctuations is also an important risk factor. It makes prices unstable and weakens company sustainability. Dependence on a single supplier is also seen as less likely, but having a high impact, disrupting the availability of purchases in the event of uncertainty.

Nevertheless, labor disputes, customs clearances, and supplier failures are seen as less grave and less likely. On the other hand, natural disasters are the lowest risk factor in the investigation's findings.

6. CONCLUSION

The goal of this research is to analyze and evaluate risk factors on the supply side, demand side, process side, environmental side, and financial side that may affect the tractor supply chain. The current study attempted to assess supply chain risks using a set of assessment tools. In the first stage, the probability and affect matrix were used. In the second

stage of the study, a hierarchy of criticality levels was used to prove the results of the first stage. The methods used in this research can be useful to researchers in studies interested in assessing and managing supply chain risks. This study will show the critical risk factors to remain at the forefront of concern in the context of the tractor industry. The results call on stakeholders to turn their attention to all sides.

REFERENCES

Abdel-Basset, M., Gunasekaran, M., Mohamed, M., & Chilamkurti, N. (2019). A framework for risk assessment, management and evaluation: Economic tool for quantifying risks in supply chain. Future Generation Computer Systems, *90*(1), 489-502.

Ali, I., & Shukran, K. (2016). Managing supply chain risks and vulnerabilities through collaboration: present and future scope. The Journal of Developing Areas, 50(5), 335-342.

Baryannis, G., Validi, S., Dani, S., & Antoniou, G. (2019). Supply chain risk management and artificial intelligence: state of the art and future research directions. International Journal of Production Research, 57(7), 2179-2202.

Blackhurst, J., Scheibe, K., & Johnso, D. (2008). Supplier risk assessment and monitoring for the automotive industry. International Journal of Physical Distribution & Logistics Management, 38(2), 143-165.

Chand, M., Raj, T., Shankar, R., & Agarwal, A. (2017)). Select the best supply chain by risk analysis for Indian industries environment using MCDM approaches. Benchmarking: An International Journal, 24(5), 1400-1413.

Chen, H. L. (2018). Supply chain risk's impact on corporate financial performance. International Journal of Operations and Production Management, 38(3), 713-731.

Christopher, M., & Peck, H. (2004). Building the Resilient Supply Chain. The International Journal of Logistics Management, 15(2), 1–14.

Dani, S. (2009). Predicting and managing Supply Chain Risks. (m. a. in Supply Chain Risk: A Handbook of Assessmt. A Handbook of assessment, Ed.) New York: G. A. Zsidisin and B. Ritchie, Eds. Springer.

Engelhardt-Nowitzki, C., & Zsifkovits, H. (2006). Complexity-Induced supply chain risks – interdependencies between supply chain risk and complexity management. New York: Springer.

Hahn, G. J., & Heinrich, K. (2012). Value-based performance and risk management in supply chains: A robust optimization approach. International Journal of Production Economics, 139(1), 135-144.

Ho, W., Zheng, T., Hakan, Y., & Talluri, S. (2015). Supply Chain Risk Management: A Literature Review. International Journal of Production Research, 53(16), 5031–5069.

Jüttner, U. (2005). Supply chain risk management: understanding the business requirements from a practitioner perspective. International Journal of Logistics Management, 16(1), 120-141.

Jüttner, U., Peck, H., & Christopher, M. (2003). Supply chain risk management: outlining an agenda for future research. International Journal of Logistics: Research and Applications, 6(4), 197-210.

Kache, F., & Seuring, S. (2014). Linking collaboration and integration to risk and performance in supply chains via a review of literature reviews. Supply Chain Management: An International Journal, 19(5/6), 664-682.

Lavastre, O., & Spalanzani, A, A. (2010). How to manage supply chain risks? A response through SCRM practices (in frensh). XIXème Conférence Internationale de Management Stratégique (p. E5). Luxembourg: HAL archives-ouvertes.fr.

Mangla, S. K., Kumar, P., & Barua, M. K. (2015). Risk analysis in green supply chain using fuzzy AHP approach: A case study. Resources, Conservation and recycling, 104, 375-390.

Manuj, I., & Mentzer, J. (2008). Global Supply Chain Risk Management Strategies. International Journal of Physical Distribution and Logistics Management, 38(3), 192–223.

Ponomarov, S., & Holcomb, M. (2009). Understanding the concept of supply chain resilience. International Journal of Logistics Management, 20(1), 124-143.

Rao, S., & Goldsby, T. (2009). Supply Chain Risks: A Review and Typology. *The* International Journal of Logistics Management, 20(1), 97–123.

Saker, B., Chaib, R., & Kahlouche, A. (2021). For an Effective Management of the Functional Capacities of Companies: A Study of Pharmaceutical Companies. International Journal of Safety and Security Engineering, 11(5), 557-563.

Saker, B., & Chaib, R. (2022). Effective and Sustainable Management of Risk Disrupting the Supply Chain Activities: The Case of the ETRAG Company. International Journal of Performability Engineering, 18(11).

Samvedi, A., Jain, V., & Chan, F. (2013). Quantifying risks in a supply chain through integration of fuzzy AHP and fuzzy TOPSIS. International Journal of Production Research, 51(8), 2433-2442.

Sreedevi, R., & Saranga, H. (2017). Risks and supply chain risk: the moderating role of supply chain flexibility in risk mitigation. International Journal of Production Economics, 193, 332-342.

Tang, C. (2006). Perspectives in supply chain risk management. International journal of production economics, 103(2), 451-488.

Tummala, R., & Schoenherr, T. (2011). Assessing and managing risks using the supply chain risk management process (SCRMP). Supply Chain Management: An International Journal, 16(6), 474-483.

Wu, D. D., David, L. O., & John, R. B. (2011). Introduction to special issue on Enterprise risk management in operations. International Journal of Production Economics, 134(1), 1-2.

Yang, Z. k., & Li, J. (2010). Assessment of green supply chain risk based on circular economy. Industrial Engineering and Engineering Management (IE&EM), 17th International Conference on IEEE, (pp. 1276-1280.).

Yin, R. (2009). Case study research. London: Design and methods, sage publication.

Zhao, L., Huo, B., Sun, L., & Xiande, Z. (2013). The impact of supply chain risk on supply chain integration and company performance: a global investigation. Supply Chain Management: An International Journal, 18(2), 115-131.

Volume XIX, Issue (1) (2023) 133-143

International May Conference on Strategic Management

STRATEGIC DIRECTIONS OF BUSINESS ENTITIES INNOVATIVE INTERACTION: FINANCIAL INCENTIVES, TOOLS AND LEVERS OF KNOWLEDGE ECONOMY DEVELOPMENT

Tetyana Calinescu[1], Ganna Likhonosova[1*], Olena Zelenko[2]

[1]National Aerospace University "Kharkiv Aviation Institute", Ukraine;
[2]Volodymyr Dahl East Ukrainian National University, Ukraine

Abstract: The article presents the author's vision of the strategic directions of innovative interaction of business entities under the conditions of the implementation of financial incentives, tools and levers for the development of the knowledge economy. Thanks to the study of problematic aspects of the motivation of innovative interaction of economic entities, the formation of conceptual approaches to the implementation of the motivation of innovative interaction of economic entities in Ukraine is proposed. In addition, authors have developed a mechanism for stimulating the innovative activity of enterprises in the conditions of recovery and the knowledge economy, which will allow to solve the strategic tasks of modernization and development of production assets, infrastructure and human capital of Ukraine. The recommendations given by the authors have practical significance in the direction of the need to focus attention on increasing the interactive interaction of all key subjects of the renewable economy on financing innovations. It has been proven that precisely in the conditions of the knowledge economy, the development of a complex financial mechanism will lead to an increase in the competitiveness of the renewable economy due to the strengthening of the innovative and digital potential of the country.

Keywords: innovative interaction, financial incentives, knowledge economy, recovery, strategic directions.

1. INTRODUCTION

In the modern digital economy, based on the flow of knowledge, which is updated every minute, the key sector of the economy is industry, based on a clear logistic interaction of business entities. Because scientific and technological progress is mainly implemented through industrial and new information technologies, and their production and distribution are concentrated in industries and sectors of industry. For Ukraine, increasing the competitiveness of industry is one of the most important strategic tasks in terms of the recovery and modernization of the national economy, the solution of which depends on economic growth, business development, the level of well-being of the population, and the possibility of effective integration of the country's economy into the world economic system, which is rapidly changing in the modern context.

Because of the war, Ukraine has already lost at least 30–50% of its production capacity, mainly in the East of the country. The vast majority of these capacities belonged to the sphere

[*] *Corresponding author: a.likhonosova@gmail.com*

of heavy industry, in which 25-30% of the economically active population was employed (Danylyshyn, 2022). Only 1% of Ukrainian companies have still not suffered losses as a result of military operations. Therefore, today's challenges, which Ukraine faces, motivate the creation of a new system of relations between economic entities, increasing the importance of innovations not only in strengthening the country's defense capabilities, but also in making socially responsible decisions, creating further national strategies for the recovery of the activities of most economic entities, which determine the development priorities of the country's economy as a whole. Despite all the positives that generate innovation, certain incentives should be created on the part of the state in Ukraine, related to the implementation of an appropriate policy of restoring the state of the economy, socio-economic relations and supporting the interaction of business entities at different levels of state power and territorial administration.

2. STRATEGIC DIRECTIONS OF BUSINESS ENTITIES INNOVATIVE INTERACTION

2.1. Tools that are capable to stimulate the creation of new added value in the economy of Ukraine

The most important structural reforms that need to be implemented in Ukraine in parallel with the parallel restoration of production are the modernization of the economy on an innovative basis and the creation of new jobs. Currently, Ukraine has a whole arsenal of tools capable of stimulating the creation of new added value and generating synergistic effects in the economy, including (Yefimenko, 2012; Bazylyuk, 2019; Shostak 2019; Voloshanska, 2020; Danylyshyn, 2022): 1)investments in new workplaces, priority types and industries; 2) public-private partnership, primarily in the field of infrastructure creation for various sectors of the economy and areas of activity of business entities; 3)state assistance to business for the restoration of production in de-occupied territories and zones of active military operations; 4) state guarantees for loans and the interest rate compensation mechanism; 5) state order and purchase of socially significant goods and services; 6) nationalization of an important business facing bankruptcy; 7) stimulating the production of import-substitutable goods, etc.

It is necessary to have a certain financial resource for the implementation of these measures. Undoubtedly, today Ukraine receives a significant part of funds from international aid. However, a significant source should be the resources of the national banking system, business and household loans.

2.2. Positioning of Ukraine on the European innovation market

At the state level, the directions of financing such measures are given a strategically significant role, which is confirmed by the Strategies for the Development of the Sphere of Innovative Activity for the Period Until 2030 (Verkhovna Rada of Ukraine. Legislation of Ukraine, 2023) approved in 2019. The strategy is the basis for the formation and implementation of state policy in the field of science and technology development, as well as related innovative activities. Scaling of research and development, balanced development of high-tech and innovative business, increasing its competitiveness and significance for the economy and society are of key importance. The review of the European Innovation Scoreboard 2021 says that Ukraine has "moved" down in its indicators of innovation development compared to 2014 (Figure 1), and there is simply not much data for comparison. However, already in 2022, under the conditions of large-scale military operations on a large territory of

Ukraine, the European Innovation Scoreboard 2022 notes that the summary innovation index has risen by 1 point and is 31 (Figure 2).

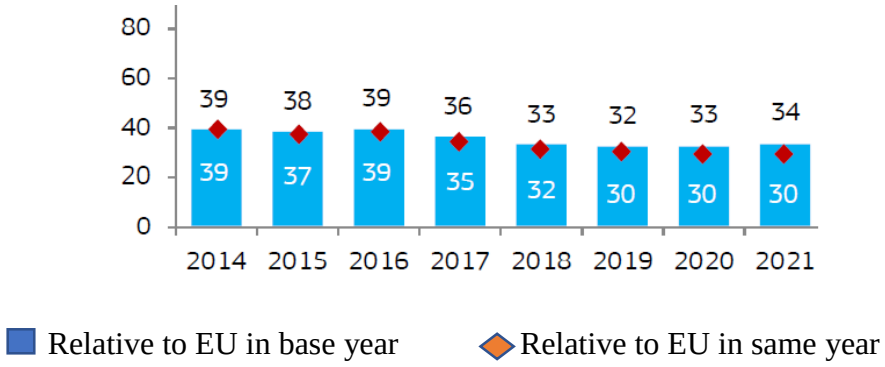


Figure 1. Summary innovation index of Ukraine relative to the EU (European Commission, 2022)

These are data such as the number of product and process innovators, categories with innovative potential (but not yet innovators), etc. The decline in existing indicators is observed by indicators such as investment in innovative activities, government support for R&D, and the number of SMEs that are connected to other.

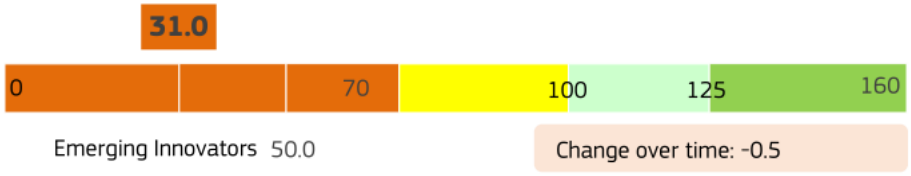


Figure 2. Innovative productivity of Ukraine from the EU average, % (European Commission, 2023)

According to the Global Innovation Index 2022, Ukraine ranks 57th among 132 economies (Global Innovation Index, 2022). In 2021, Ukraine has better results in terms of innovation indicators than in previous years and ranked 49th among 132 economies in the world (Global Innovation Index, 2021). Among the best indicators of Ukraine's innovative development is the traditionally high quality of human capital, while the worst are the state of institutions and infrastructure (91st and 94th places, respectively).

2.3. Motivation of innovative interaction of business entities in Ukraine

According to the National Academy of Sciences of Ukraine, the most promising sectors for the recovery of the national economy, which will ensure the appropriate level of employment (Danylyshyn, 2022), are: nuclear energy, titanium, lithium and aluminum production; ferrous metallurgy; heavy power engineering; pharmaceutical industry and production of medical equipment; the latest petrochemical production and production of organic products; production of synthetic liquid fuels (gasoline, diesel fuel, etc.); agricultural selection and genetics; aircraft construction, rocket construction and the space industry; development of information systems and digital transformation, etc. It is the processes of restoring production and increasing the country's defense capabilities that require the presence

of developed scientific institutions, centers for the generation of special in-depth knowledge that will help to provide adequate answers to new geopolitical challenges in the context of national transformations and the country's movement towards European standards. Hence, the constituent elements of this restructuring are (Neykov, 2017; Bazylyuk, 2019; Danylyshyn, 2022; Deineko et al., 2022): 1) formation and implementation of state policy regarding the development of science, stimulation of innovations and compliance of ensuring these processes with European requirements; 2) integration of the Ukrainian scientific sector into the European one to ensure the involvement of domestic and European scientific developments in the justification of national development priorities and employment of the population; 3) targeting the technological modernization of the production sector in order to create demand for innovative, scientific products and the implementation of specific tools (forms of state aid) to stimulate the development of the scientific and technological sphere and attract innovations; 4) introduction of European standards in the field of organization of implementation and financing of scientific research; 5) formation of new networks and centers of research and innovation infrastructure. It is recommended, in addition to existing and functioning technology parks, innovation centers, scientific and educational centers, innovative technological clusters, innovative business incubators and venture funds, the creation of centers of innovation and technology transfer, commercialization of intellectual property, regional centers of science and innovation, etc.; 6) creation of financial incentives for the productive work of researchers, specialists with in-depth special knowledge for the purpose of forming a new personnel potential of the scientific sector.

Undoubtedly, most innovations originate in the field of science. Since 1997, in Ukraine, there has been a sharp reduction in the number of organizations engaged in scientific research and the number of scientists while the number of doctors of science has increased (Zakharova, 2021). This trend has led to a sharp reduction in the innovativeness of the country's economy. Therefore, break the negative trend and change the situation in domestic science is possible by involving the young generation. And the solution to this problem lies in a comprehensive approach to scientific education and professional development of young people. At the same time, the time lag regarding the readiness of young scientists to generate real scientific projects, practical use of inventions, startups and funding should be taken into account the most promising researches for the economy of Ukraine.

The full integration of Ukraine into the EU requires the introduction of new European standards in the field of public administration, regulation of the production of goods and services, and the development of civil society. In the context of European integration, Ukraine needs to apply EU standards and practice in ensuring social rights, which include the right to ensure a fair wage, an adequate standard of living and the prevention of working poverty (Bazylyuk, 2019). Therefore, Ukraine is rethinking the state policy regarding wages and incomes in the context of ensuring the healthiest prerequisites for economic growth and mobilization of financial resources (Calinescu et al., 2022), including for business entities.

In the process of providing the real sector with the necessary financial resources, it is advisable to single out the main reasons for their inefficient use (Yefimenko, 2012):

1. external, caused by an unfavorable economic and institutional environment;
2. internal, related to the shortcomings of the organizational and economic mechanisms of the functioning of financial institutions.

However, in order to achieve the desired strategy of innovative interaction of economic entities, not only financial resources are important, but also moral incentives, tools and levers for the development of economic entities, the following basic approaches can be applied (Dudko, 2017):

1. application of incentives (those who achieve performance results are encouraged, and those who do not achieve them - apply other approaches to encouraging innovation);
2. motivation by activity (encouragement through meaningful filling of activity, stimulation of interest in achieving desired results through innovative development);
3. flexible communication with management, which is accompanied by a certain assessment of the manager (supervisor) in the event that the employee achieves (or fails to fulfill) the set goal.

The management of the motivation of innovative development of business entities should be based on the application of methods that involve the use of rewards and incentives, the development of a sense of participation, recognition of achievements, involvement in decision-making, group work with the aim of increasing the level of satisfaction with business activity, which precisely contributes improvement of regulators and motivation tools (Pisarenko, 2021). The problem in this regard is the formation of motivational tools capable of realizing the set tasks with regard to the formation of strategic directions of innovative interaction of economic entities. In general, the implementation of certain motivational tools (material or financial, moral or spiritual) regarding the innovative interaction of business entities depends on the achieved results of activities, evaluation criteria of development, the complexity of the conditions in which the entity works. Figure 3 presents conceptual approaches to various aspects of motivation.

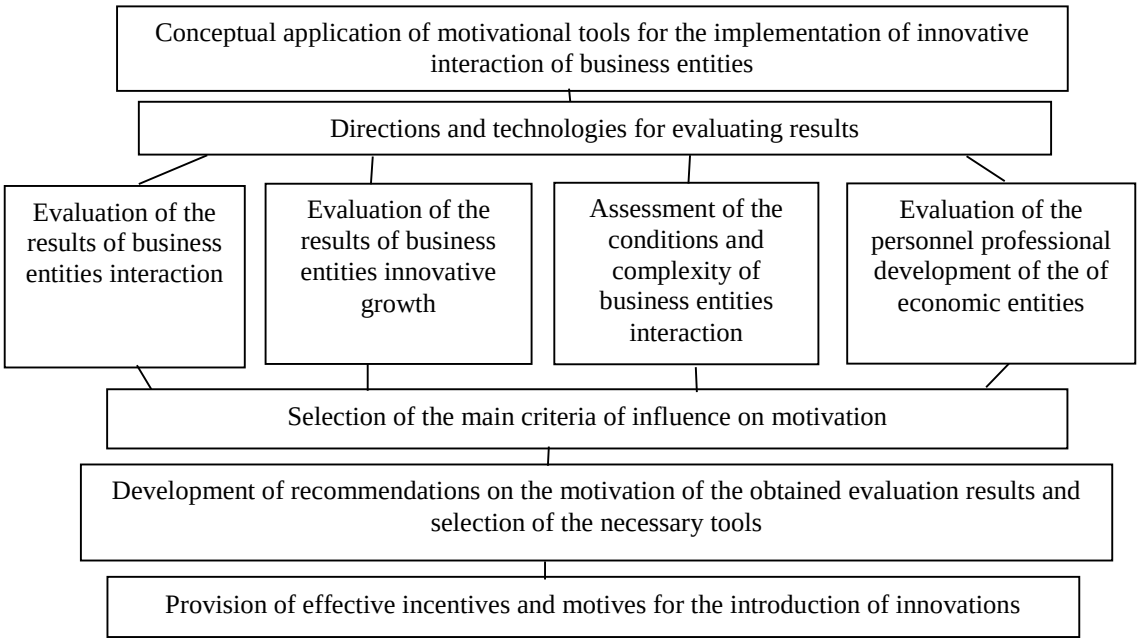


Figure 3. Conceptual approaches to various aspects of motivating innovative interaction of business entities (Authors' own development)

Figure 3 shows an attempt to understand the expediency of motivating innovative interaction of business entities based on certain results.

3. MECHANISM FOR STIMULATING THE ENTERPRISES INNOVATIVE ACTIVITY IN THE CONDITIONS OF RECOVERY AND THE KNOWLEDGE ECONOMY

3.1. Initiating the implementation of innovations for various business sectors

It should be noted that recently the country's government did not create sufficient incentives for the development of the main types of products, focusing on import substitution with cheaper and sometimes higher quality products of foreign manufacturers. The accelerated growth of imports is turning into one of the main restrictions on the path of economic growth in Ukraine. Insufficient competitiveness of Ukrainian manufacturers forces them to give up part of the increase in domestic demand to foreign competitors. This trend is most clearly manifested in the machine-building industry, where there is an increase in the import of machine-building products from economically developed countries.

It is generally accepted that solving the strategic tasks of modernization and development of production assets, infrastructure and human capital within the framework of the innovative path of development is associated with significant investment resources, which must be accumulated and effectively distributed across sectors and branches of the economy of Ukraine. At the same time, increasing the innovative activity of industrial enterprises as a key factor in sustainable growth rates of the economy must be ensured, on the one hand, by the optimal ratio of the stimulating influence of the state on the innovation process, including the investment component, and on the other hand, by market mechanisms and internal settings of modern enterprises focused on increasing competitiveness due to the development and implementation of innovations (Figure 4).

Figure 4 shows that the initiation of innovations for small and medium business sectors occupies a basic place in the mechanism of stimulating the innovative activity of enterprises in the conditions of recovery. Small innovative enterprises are the initiators of the creation and subsequent satisfaction of new, previously unknown market needs. It is precisely such enterprises, the basis of which is the implementation of the principles of the knowledge economy, that perform the task of transforming advanced scientific and technical developments into a commercial product. It is worth noting that within the framework of this study, a small innovative enterprise or startup is understood as a type of economic activity aimed at the implementation of innovations in order to maximize profits, as the most dynamic element of the new economy.

The leading countries in terms of the number of startups as of 2021 are Switzerland - 1791 startups/million people, Singapore - 1393 startups/million people, the USA - 1211 startups/million people. 2022 was a very difficult year for Ukrainian startups – as well as for all business. However, despite the war, many Ukrainian projects managed to attract investments. According to the Mind generator, 54 deals have been recorded in the market. The amount of funding is disclosed in only 38 startups and amounts to more than $724.4 million (Pidgaina, 2022).

From the given stimulation of innovative activity of enterprises in the conditions of recovery and knowledge economy (Figure 3), it is clear that the greatest emphasis is placed on financial incentives. However, an effective financial mechanism should be comprehensive, as industry and integration incentives affect the financial levers for stimulating the innovative activity of industrial corporations. Therefore, it is impossible not to take into account the mutual influence of incentives in the proposed financial mechanism, which consists in the following aspects: 1) the active use of financial incentives will ultimately affect the development of the Ukrainian financial market and the integration of industrial business (integration incentive); 2)

the industry incentive is reflected in the full use of the technological capabilities of the industrial corporation, which reflect the efficiency of innovative activity from the point of view of the intensity of the production of innovative products. To increase the technological level, financial investments are necessary, which will allow to achieve an increase in the profitability of the industrial corporation in the future.

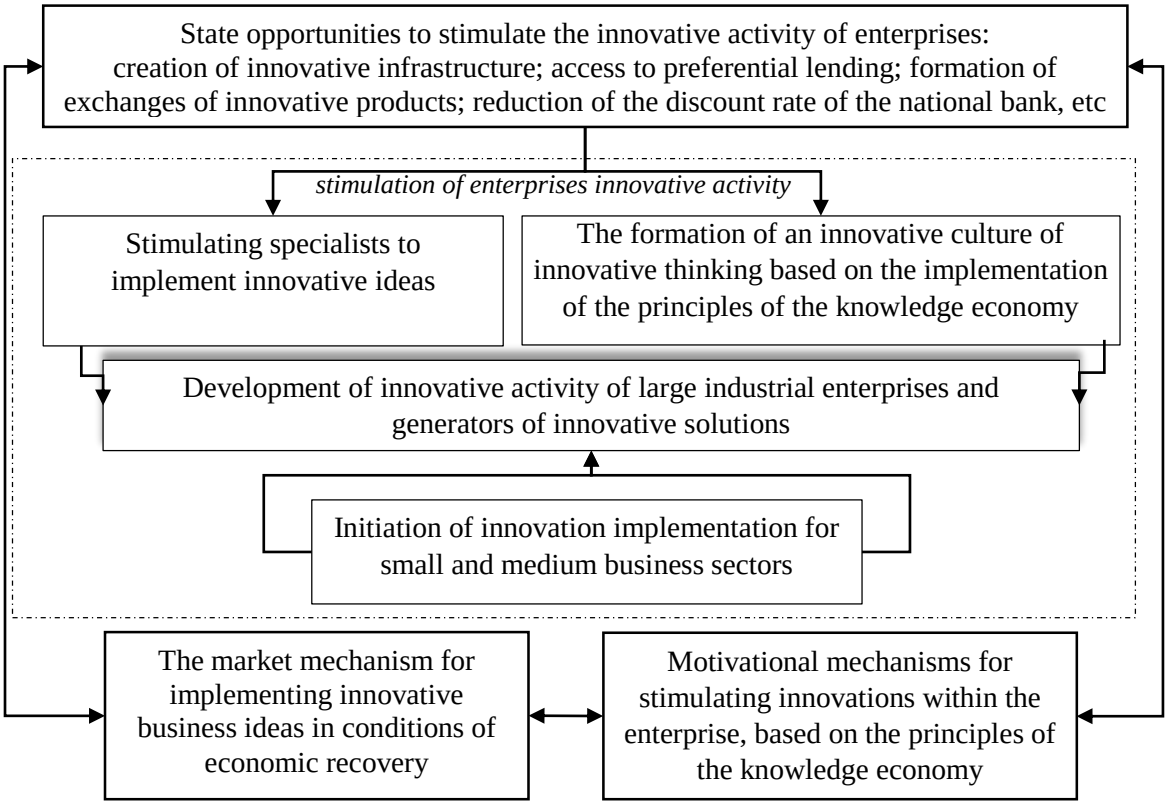


Figure 4. The mechanism for stimulating the innovative activity of enterprises in the conditions of recovery and the knowledge economy (authors' own development)

3.2. Formation of corridors of innovative business activity

The proposed comprehensive financial mechanism (Figure 4) has several goals. Firstly, with its help, you can create conditions for free maneuvering of free cash flows, secondly, it promotes the concentration of resources in the basic sectors of the economy for development. The results of the study of scientific and innovative activity in Ukraine confirm that industrial sectors in the country are differentiated by technological level, which is a constituent element of innovative activity (Pysarenko et al., 2021). At the same time, under the conditions of Ukraine's transition to digital mechanisms of economic development, it is necessary to supplement the existing classification of industrial sectors by the level of innovative activity with a parameter that reflects the intensity of application and development of digital technologies. We suggest calling this parameter the level of digital activity of industrial corporations.

The significance of the combination of innovative and digital activity in the proposed classification of industries is that in the stage of implementation of innovative activity, it should be considered from different sides: import (implementation of technologies) and export (production of products) of innovations.

The proposed classification provides for the differentiation of industrial corporations according to the level of innovative and digital activity into several groups: highly active, medium active and low active. To determine the level of innovative activity for each branch of industry, only two indicators were chosen: the innovative power of the product on the market and the share of innovative products in the total volume of shipped goods. Under the product's innovative power, we propose to interpret the degree of its innovativeness in comparison with other products offered on the market, as well as the product's ability to increase the innovative potential of an industrial corporation. At the same time, the degree of innovativeness of the product will be higher if the industrial corporation is focused not only on export, but also on the import of innovations. Taking into account the use of innovative production capacities, the product's innovative power on the market will be higher than in other cases. Therefore, we believe that the innovative power of the product on the market should include parameters reflecting the production processes of innovative activity, in addition to economic indicators. The choice of parameters for determining the innovative activity of industrial corporations is related to the fact that we are interested in the relative assessment of the level of innovative activity. The level of digital activity of industrial corporations consists of several components, the most important of which are investments in digital technologies, the turnover of electronic trade in products, as well as the number of people employed in the field of digital technologies (State Statistical Service of Ukraine, 2021). With the help of these indicators, it is possible to achieve effective stimulation of the innovative activity of industrial corporations in the conditions of recovery of the Ukrainian economy. Table 1 presents the results of calculating the level of innovative and digital activity of industrial corporations based on the proposed differentiation of industrial sectors.

Table 1. Classification of industrial corporations by the level of innovative and digital activity, 2022 (State Statistical Service of Ukraine, 2023; State Statistical Service of Ukraine, 2022)

Group of industries	Level of innovative activity, %	Level of digital activity, %	The level of implementation of innovative activity, %
Highly active	21,1	10,0	30,1
Pharmaceutical industry	20,2	10,0	30,2
Production of high-tech and optical products	20,0	9,9	29,9
Medium active	13,1	6,6	19,7
Production of non-metallic and mineral products	12,9	6,5	19,4
Metallurgical production	12,3	6,2	18,5
Low active	5,8	2,9	8,7
Printing industry	2,7	1,3	4,0
Production of furniture	4,2	2,1	6,3
Light industry	4,1	2,0	6,1

According to the results of calculations of the level of innovative and digital activity, it was possible to determine the corridors of digital values of the general level of activity of each group of industries: highly active, medium active and low active. Corresponding corridors of innovative activity can be used in the application of the methodology of differentiation of industries in other research areas. The distribution is as follows: highly active industries include those whose total activity exceeds the 20% mark; medium-active industries include those in which the change in overall activity is subject to a range of 10 to 20%; low-activity industries include those in which the change in total activity is subject to a range from 0.1% to 10%. The obtained results in Table 1 correspond to the same corridors of digital values.

At present, the share of highly active industrial sectors slightly exceeds 20%, despite the fact that the constant introduction of technological innovations in such industrial enterprises has a positive effect on the amount of added value. In the future, this aspect will lead to increasing the country's innovation potential among other world states. The growth of the added value of highly active industrial enterprises occurs not only due to the introduction of technological innovations, but also due to high investment attractiveness. This is explained by the fact that industrial enterprises belonging to the highly active group are quite flexible to external (market) changes. Such adaptation to the fluctuations of the market situation is due to the fact that the industrial system is very dynamic, although the system of management and organization of production is indeed a complex system due to the fact that the application of a process approach to management is characteristic of industrial enterprises.

4. CONCLUSION

On the basis of the conducted research, the following conclusions can be drawn:

- about the need to make efforts to implement the selected vector of innovative development of business entities, accumulate knowledge in various spheres of activity and use them for the benefit of production and people.
- on promoting the application of motivation, special factors regarding the effective functioning of economic entities.

The study proposed a mechanism for stimulating the innovative activity of enterprises in the conditions of recovery and the knowledge economy, which reflects the development of a complex financial model for stimulating the innovative activity of industrial enterprises, as well as modern sectoral and financial features of the functioning of Ukrainian enterprises. The given recommendations have a certain practical significance due to the fact that today it is necessary to focus attention on increasing the interactive interaction of all key subjects of the renewable economy on the financing of innovations. It is in the conditions of the knowledge economy that the development of a complex financial mechanism will lead to an increase in the competitiveness of the regenerative economy due to the strengthening of innovative and digital potential.

REFERENCES

Bazylyuk, V. (2019). Financial motivators of economic growth and drivers of a new quality of life in Ukraine. Financial and credit mechanism of economic and social development: Materials of the 2nd International Scientific and Practical Internet Conference, 24-25 October 2019, Kropyvnytskyi. Kyiv: "Exclusive-System", 13–16. (in Ukrainian)

Calinescu, T., Likhonosova, G., & Zelenko, O. (2022). International financial activities: accounting, taxation and insurance. Baltic journal of economic studies, 8(2), 83–90.

Deineko, L.V., Sheludko, E.I., Zavgorodnia, M.Yu., & Galaieva, L.V. (2022). Tools for the preservation and development of the intellectual personnel potential of the industry the industry of Ukraine. Ukrainian socìety, 3(82), 84–105. (in Ukrainian)

Dudko, S. (2017). Personnel professional development: evaluation and motivation technologies and motivation mechanism. Scientific journal Herald of Khmelnytskyi National University: Economic sciences, 1(2), 57–65. (in Ukrainian)

Danylyshyn, B. (2022). Structural reforms, which can change Ukraine. Retrieved from https://www.epravda.com.ua/columns/2022/05/31/687649/ (Date accessed: February 21, 2023) (in Ukrainian)

European Commission. European Union. (2023). European Innovation Scoreboard 2023. Research and innovation. Retrieved from https://research-and-innovation.ec.europa.eu/statistics/performance-indicators/european-innovation-scoreboard_en (Date accessed: February 17, 2023)

European Commission. European Union. (2022). European Innovation Scoreboard 2022. Research and innovation. Retrieved from https://ec.europa.eu/assets/rtd/eis/2022/ec_rtd_eis-country-profile-ua.pdf (Date accessed: February 23, 2023)

Global Innovation Index 2021. Tracking Innovation through the COVID-19 Crisis. Retrieved from https://www.wipo.int/global_innovation_index/en/2021/ (Date accessed: February 19, 2023)

Global Innovation Index 2022. What is the future of innovation-driven growth? Retrieved from https://www.wipo.int/global_innovation_index/en/2022/ (Date accessed: February 16, 2023)

Neykov, S.A. (2017). Priority tax changes in conditions of formation and diversification of innovative economy. Economics: time realities. Scientific journal, 5(33), 51–58. (in Ukrainian)

Pidgaina, Y. (2022). Top 8 Ukrainian startups in 2022: Who managed to attract the largest amount of investment? Retrieved from https://mind.ua/en/publications/20251229-top-8-ukrainian-startups-in-2022-who-managed-to-attract-the-largest-amount-of-investment (Date accessed: February 16, 2023) (in Ukrainian)

Pisarenko, T.V., & Kuranda, T.K., & Kvasha, T.K. (2021). The state of scientific and innovative activity in Ukraine in 2020: a scientific and analytical note. Kyiv: UkrINTEI (in Ukrainian).

Shostak, L. (2019). Tools for promoting investment-innovative development of regions of Ukraine. Scientific Notes of Taurida Natinal V.S. Vernadsky University. Series: Economy and Management, 30(69), 1, 89–94. (in Ukrainian)

State Statistical Service of Ukraine. (2021). Methodology for calculating indicators of innovative activity of enterprises. Order of the State Statistics Service, dated September 30, 2021 # 248. Kyiv: State Statistics Service of Ukraine, 21. (in Ukrainian)

State Statistical Service of Ukraine. (2022). The number of innovatively active enterprises by types of economic activity, 2020-2022. Statistical information. Retrieved from https://www.ukrstat.gov.ua/ (Date accessed: February 23, 2023) (in Ukrainian)

State Statistical Service of Ukraine. (2023). Production of industrial products by types in 2022. Statistical information. Retrieved from: https://www.ukrstat.gov.ua/ (Date accessed: February 23, 2023) (in Ukrainian)

Verkhovna Rada of Ukraine. Legislation of Ukraine. (2023). On the approval of the Strategy for the development of the sphere of innovative activity for the period until 2030. Decree of the Cabinet of Ministers of Ukraine, dated July 10, 2019 # 526-r. Retrieved from https://zakon.rada.gov.ua/laws/show/526-2019-%D1%80#Text (Date accessed: February 19, 2023) (in Ukrainian)

Voloshanska, A. (2020). Innovative model of development as a tool of transformatiom of economic policy of country. Efektyvna ekonomika, 3. Retrieved from http://www.economy.nayka.com.ua/?op=1&z=7744 (Date accessed: February 23, 2023) (in Ukrainian)

Yefimenko, T. I. (2012). The financial system of the national economy: problems of development and change management. In 3 vol. Kyiv: SESI "Acad. Finn. Management". Vol. 1, 355–383. (in Ukrainian)

Zakharova, O.V. (2021). Prospects of building the knowledge economy in Ukraine. Zbirnyk naukovyh prats (Proceedings of Scientific Works) Cherkaskogo derzhavnogo technologichnogo universitetu Seria: Ekonomichni nauky, 51, 21–24. (in Ukrainian)

Volume XIX, Issue (1) (2023) 144-153

International May Conference on Strategic Management

ASSESSMENT OF CUTTING REGIMES IN TURNING OF POM-C USING A PCD TOOL BASED ON AHP-WASPAS APPROACH

Miloš Madić*, Milan Trifunović, Dušan Petković

University of Niš, Faculty of Mechanical Engineering in Niš, Serbia

Abstract: The selection of the most adequate set of machining parameters in turning for a given application is not straightforward and requires consideration of a number of techno-technological, quality, machinability, productivity and economic criteria. In this study a multi-criteria decision making (MCDM) model for assessment of cutting regimes in turning of acetal copolymer (POM-C) using a polycrystalline diamond (PCD) cutting tool was developed. Experimental data, acquired after performing factorial design 2^3 with central point, were used for definition of nine alternative cutting regimes in terms of depth of cut, feed rate and cutting speed. Assessment and ranking of alternative cutting regimes were performed using the weighted aggregated sum product assessment (WASPAS) method while considering surface roughness, workpiece deflection, convenience of chip form and material removal rate as criteria. The relative importance of considered criteria was estimated by pair-wise comparison matrix and geometric mean method of the analytic hierarchy process (AHP). An analysis of the final ranking stability regarding the change of coefficient of linear combination values was also performed.

Keywords: turning, cutting regime, POM-C, MCDM, WASPAS

1. INTRODUCTION

Turning technology still plays significant role in modern industry due to favourable cutting mechanics for a wide variety of materials. It belongs to traditional material removal technologies in which material is removed in the form of chips from the rotating cylindrical workpiece by a single point cutting tool with a geometrically defined cutting edge. Complex cutting mechanics and accompanying phenomena which take place during the machining process are governed by the main turning parameters, and these, on the other hand, are selected considering workpiece material, cutting tool, cooling and lubrication conditions, as well as required process performances such as quality characteristics, productivity, costs, power consumption, etc. (Madić et al., 2022).

In manufacturing companies, it is a common practice that machining process planning engineers determine cutting regimes based on acquired knowledge, previous experience, machining handbooks and by considering cutting tool manufacturer recommendations (Singaravel & Selvaraj, 2015; Reddy, 2020). Although this, essentially subjective and from case to case approach, may often be sufficient, the selected cutting parameters may not even coincide with near optimal cutting conditions, particularly when considering multiple objectives. As in many manufacturing processes, certain machining conditions that are

* *Corresponding author: milos.madic@masfak.ni.ac.rs*

suitable for one performance characteristic may actually deteriorate other performance characteristics. Moreover, inadequate selection of cutting regimes may cause underutilization of turning technology, decrease in productivity, higher costs or unacceptably high degree of non-compliant products and scrap.

To avoid these and similar problems, different scientific methods and engineering approaches are also well recognized in production practice. Among the well-known Taguchi's robust design methodology, integration of empirical models and optimization algorithms, application of different multi-criteria decision making MCDM methods is recently becoming increasingly popular for assessment and selection of alternative cutting regimes in turning. Duc Trung (2022b) applied recently developed Measurement of Alternatives and Ranking according to the Compromise Solution (MARCOS) method for solving three MCDM problems in turning, milling and grinding. Criteria weights were determined by four different methods including Equal weight, Rank Order Centroid, Rank Sum and Entropy. The same author applied three MCDM methods (Pareto-Edgeworth Grierson (PEG), Preference Selection Index (PSI) and Collaborative Unbiased Rank List Integration (CURLI)) for assessment and ranking of sixteen machining conditions in turning of SB410 steel using coated carbide tool under dry conditions (Duc Trung, 2022a). Two criteria were considered, namely, surface roughness and material removal rate (MRR). Van Thien et al. (2021) applied VIKOR method for ranking of nine alternative cutting regimes in turning of EN 10503 steel using coated carbide tools. Taguchi's L_9 orthogonal array (OA) was used for arranging four turning parameters (depth of cut, feed rate, cutting speed and tool nose radius) at three levels. Alternative cutting regimes were assessed with respect to a set of criteria related to the surface roughness, cutting force components, vibration component amplitudes and MRR. Reddy (2020) proposed integration of Criteria Importance Through Inter Criteria (CRITIC) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) methods for the optimization of cutting conditions, in terms of surface roughness and MRR, in turning of Al7075 hybrid metal-matrix composites. Taguchi's L_{16} OA was selected for experimentation, whereas cutting speed, depth of cut and feed rate were varied at four levels. TOPSIS method was applied by Umamaheswarrao et al. (2019) for multi-objective optimization of cutting parameters in hard turning of AISI 52100 steel using a polycrystalline cubic boron nitride (PCBN) cutting tool. In the study machining force and surface roughness were used as criteria for assessment of 32 cutting conditions, as per center composite rotatable design (CCD), in which five parameters (depth of cut, feed rate, cutting speed, tool nose radius and tool rake angle) were varied at three levels. Analytic Hierarchy Process (AHP), TOPSIS and Simple Additive Weighting (SAW) methods were implemented by Singh et al. (2019) to determine the best trade-off machining condition in turning of Ti-6Al-4V alloy with textured tool under minimum quantity lubrication (MQL). Average surface roughness, flank wear, tangential cutting force and cutting temperature were used as criteria. The experiment was designed and performed using Taguchi's L_{27} OA in which depth of cut, feed rate and cutting speed were varied at three levels. Pathapalli et al. (2020) applied Weighted Aggregated Sum Product Assessment (WASPAS) and Multi Objective Optimization based on Ratio Analysis (MOORA) for assessment of machining conditions in turning of Al 6063 reinforced with TiC at 5, 10 and 15 Wt.% metal matrix composites with respect to surface roughness, cutting force, and MRR. Experimental investigation regarding the influence of four parameters (cutting speed, feed rate, depth of cut and tool rake angle) and sustainable cutting conditions (dry and MQL) on cutting force components, resultant cutting force and shape deviations (i.e., circularity and cylindricity) in turning of 6026-T9 aluminum alloy using uncoated tungsten carbide tool was performed by Abas et al. (2020). Experimental trials were performed based on Taguchi's mixture L_{16} OA. The authors applied Taguchi based S/N ratio coupled with

MOORA and CRITIC methods for multi-objective optimization purposes. Dubey et al. (2021) used MOORA, VIKOR and TOPSIS methods for multi-objective optimization of cutting conditions in MQL turning of AISI 304 steel using hybrid nano-cutting fluid and tungsten carbide inserts. Box-Behnken design was used in the study, with four factors (depth of cut, feed rate, cutting speed and nanofluid concentration) varied at three different levels. Krishnaveni et al. (2016) applied COmplex PRoportional ASsessment (COPRAS) method for the evaluation of cutting regimes, with respect to surface roughness, MRR, machining time and tool nose radius wear, in turning of AISI 304 stainless steel. Taguchi's L_8 OA was used for arranging five machining parameters at two levels. TOPSIS method was used by Khan and Maity (2017) in order to select the optimal process parameters in turning of pure titanium using uncoated carbide inserts in dry cutting conditions. Cutting force, surface roughness, cutting temperature and MRR were used for assessment of different cutting regimes, defined in terms of cutting speed, feed rate and depth of cut. The weights of criteria were defined by decision maker. Majumder and Saha (2018) proposed integration of MOORA method with Principal Component Analysis (PCA) for the assessment of different cutting regimes in turning of ASTM A588 mild steel. Cutting regimes were defined in terms of the spindle speed, depth of cut and feed rate, and were assessed considering power consumption, average surface roughness and frequency of tool vibration. Singaravel and Selvaraj (2015) determined optimal machining conditions for turning of EN25 steel with coated carbide tools using TOPSIS and AHP methods. Micro-hardness, surface roughness and MRR composed the criteria set for evaluation of machining conditions defined in terms of depth of cut, feed rate, cutting speed and tool coating type. Petković et al. (2017) investigated applicability and effectiveness of the PSI method for solving machining MCDM problems. Very good ranking correlation was obtained between PSI and other MCDM methods, thus validating the usefulness of the PSI method for solving machining MCDM problems. Madić et al. (2015b) applied WASPAS method for selection of VCGT cutting inserts for aluminum turning while considering depth of cut, feed rate, cutting speed and cost as criteria for assessment of alternatives.

From the literature review it can be observed that assessment, ranking and selection of cutting regimes, attempted using different experimental designs of different resolutions, was conducted using different MCDM methods, whereas the set of criteria usually considered few important machining performances related to quality, process mechanics and productivity. The aim of the present study is assessment of cutting regimes in turning of acetal copolymer (POM-C) using polycrystalline diamond (PCD) cutting tool. The MCDM model considered four criteria (surface roughness, workpiece deflection, convenience of chip form and MRR) covering important aspects such as workpiece quality and dimensional accuracy as well as productivity. Turning experiment, planned according to the standard factorial design 2^3 with central point, defined nine different cutting regimes, which were considered as alternatives in the proposed MCDM model. Decision rule for assessment and ranking of alternative cutting regimes was developed using WASPAS method, wherein AHP was applied to determine criteria weights. An analysis of the final ranking stability, regarding the change of coefficient of linear combination values, was also performed.

2. EXPERIMENTAL DETAILS

The material used for cutting was unreinforced acetal copolymer POM-C. POM-C is a semicrystalline thermoplastic, characterized by a low coefficient of friction and good wear properties, unaffected by wet environments. The machine tool is the universal lathe machine POTISJE PA-C 30 with the motor power of P_m = 11 kW, and spindle speed range of n = 20-

2000 rpm. Stock is a bar with the diameter of 80 mm and the length of 180 mm. The cutting tool is a toolholder Sandvik Coromant SVJBR 3225P 16 (cutting edge angle of κ = 93°) with a Walter VCGT160408FS-1 insert, rake angle of γ_{0i} = 10°, effective cutting edge length l_e = 4.5 mm, nose radius r_ε = 0.8 mm, and grade of WDN10 (PCD).

Standard factorial design 2^3 with central point was adopted for the experimental investigation. Nine different cutting regimes in terms of depth of cut, feed rate and cutting speed were considered as alternatives for dry longitudinal single-pass turning (Table 1).

Four criteria were considered: surface roughness, workpiece deflection, convenience of chip form and MRR. Workpiece quality is one of the most important machining process performances. It is determined by the deviation of the surface properties from the ideal target values (dimensions, form, position, roughness, physical properties of the external zone). Surface roughness is important for the function of the workpiece. It affects and determines many functional aspects and properties, such as the coefficient of friction, presence/remain of a liquid film between two bodies (lubrication), sealing, stiffness of a connection, plastic or elastic deformation at contact, thermal and electrical conductivity, wear/fatigue contact (Chatti et al., 2019). The machined surface roughness is typically characterized by the arithmetic mean roughness (R_a) (Radovanović, 2019). Part function and performance are also related to assigned dimensional tolerances. Dimensional accuracy of the produced part can be affected by elastic workpiece deflection during machining, which causes the difference between the actual depth of cut and the set one (Benardos et al., 2006). This is especially important to consider when machining materials whose modulus of elasticity is significantly lower compared to metals (Trifunović et al., 2023). Surface waviness can also be caused by workpiece deflection (Grzesik, 2017). The material removal rate (the volume of material removed per unit time) is the most common measurement of productivity. It has been increased to such an extent in turning process that the chip control can become a major limiting factor in the process (Toenshoff & Denkena, 2013). Chip form (and chip control) can be the prevalent criteria for the evaluation of workpiece material machinability, especially for turning of industrial plastics (Trifunović et al., 2021). Handling and disposing of unfavourable chip forms is neither easy, nor safe and ultimately requires machine tool shutdown.

3. MCDM MODEL

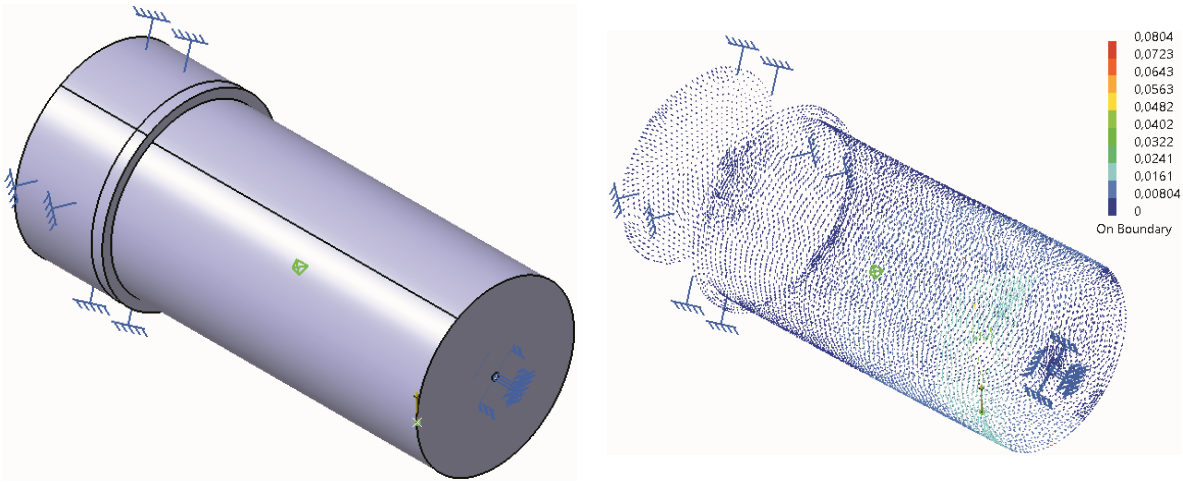
Based on the conducted experimental trials and measured, estimated, and simulated performance characteristics, the MCDM model for turning of POM-C using a PCD tool was developed (Table 1). In the MCDM framework, the experimental trials with specific combination of cutting parameter values (depth of cut a_p, feed rate f, and cutting speed v) represent alternatives, whereas surface roughness (R_a), MRR, convenience of chip form (C_{CF}) and workpiece deflection (d_w) represent criteria for assessment of alternatives, i.e., cutting regimes. Here, it should be noted that MRR and convenience of chip form are criteria of maximization type, while the other are minimization criteria, i.e., lower attribute values of alternatives are preferred.

The surface roughness was measured using a Mahr MarSurf XR 1 PC-based roughness measuring unit. The material removal rate was estimated using the well-known equation:

$$MRR = \frac{1000 \cdot a_p \cdot f \cdot v_c}{60} \quad (1)$$

where: MRR (mm^3/s) is the material removal rate, a_p (mm) is the depth of cut, f (mm/rev) is the feed rate, and v (m/min) is the cutting speed.

Chip forms from experimental trials were collected for future evaluation. Workpiece deflection for each experimental trial was obtained by performing finite element static structural analysis in CATIA software (Figure 1). Cutting force components for the given cutting parameter values, previously measured with a KISTLER Quartz three-component dynamometer, were applied as load.



a) b)

Figure 1. Workpiece deflection analysis: CAD model with boundary conditions (a) and displacements computed by means of finite element models (b)

Table 1. MCDM model for turning of POM-C

Experimental trial (alternative)	a_p (mm)	f (mm/o)	v (m/min)	R_a (μm)	MRR (mm^3/s)	C_{CF}	d_w (mm)
A1	1	0.049	188.5	0.464	154	3	0.00261
A2	4	0.049	188.5	0.449	616	1	0.0132
A3	1	0.392	188.5	1.452	1232	9	0.0202
A4	4	0.392	188.5	1.544	4926	6	0.0799
A5	1	0.049	510.5	0.431	417	4	0.00224
A6	4	0.049	510.5	0.421	1668	2	0.0204
A7	1	0.392	510.5	1.499	3335	5	0.0177
A8	4	0.392	510.5	1.474	13341	7	0.0804
A9	2.5	0.214	345.6	0.657	3082	10	0.0274

The convenience of chip form is a measure that shows the convenience of chip removal from the cutting zone and working area for a given cutting conditions and is not quantifiable, but can be represented descriptively/linguistically. Therefore, prior to the application of the WASPAS methods one needs to convert these linguistic terms into crisp values. To this aim scale [1, 10] was used (Rao, 2007).

Relative significance, i.e., criteria weights, of the considered criteria from the proposed turning MCDM model were determined using the geometric mean method of the AHP. The Saaty's nine-point preference scale (Saaty, 1980) is adopted for constructing the pair-wise comparison matrix based on authors experience and knowledge regarding turning (Table 2).

Table 2. Pair-wise comparison matrix of criteria

	R_a	MRR	C_{CF}	d_w
R_a	1	1	0.333	2
MRR	1	1	0.333	2
C_{CF}	3	3	1	3
d_w	0.5	0.5	0.333	1
λ_{max} = 4.06, CI = 0.02, CR = 0.023				

Using the computational procedure of the geometric mean method of the AHP, the criteria weights were determined as: w_1 = 0.195, w_2 = 0.195, w_3 = 0.493 and w_4 = 0.116. Therefore, convenience of chip form is the most significant criterion, followed by surface roughness and MRR, as criteria of equal importance, and finally workpiece deflection. Due to the subjectivity of the approach, consistency check of relative significance of criteria was performed. For five considered criteria, i.e., for random index (RI) of 0.89, consistency ratio (CR) value of 0.023 was obtained indicating that there was no contradiction in the judgments and that determination of criteria weights is reasonable.

4. RESULTS AND DISCUSSION

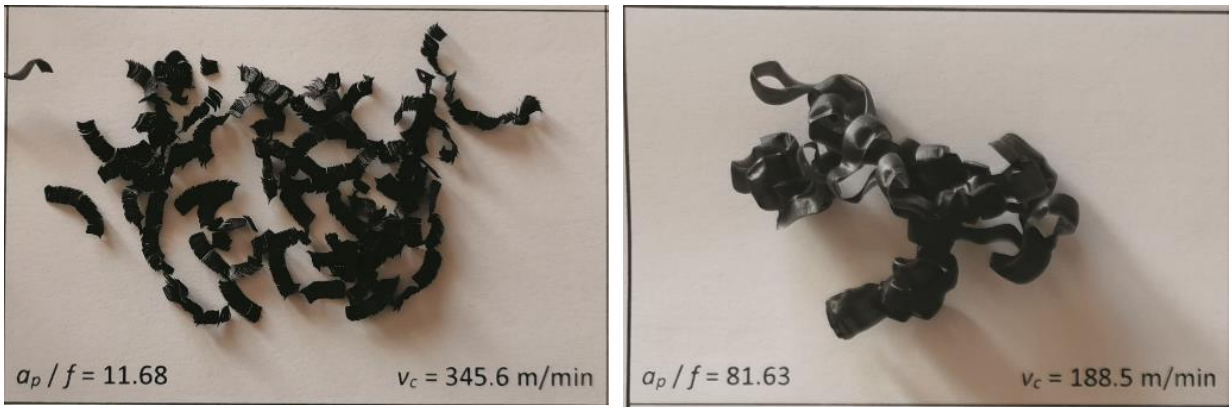
WASPAS method (Zavadskas, 2012) was applied for generation of the decision rule for assessment of alternative cutting regimes in the proposed MCDM model. This MCDM method actually represents a unique combination of two well-known MCDM methods, i.e., Weighted Sum Method (WSM) and Weighted Product Method (WPM). The main computational procedure of the method for solving MCDM problems includes several steps, which are given in referential literature (Zavadskas, 2012; Madić et al., 2015a). Total relative importance (Q) and ranking of alternatives as per WASPAS method, for default value of the coefficient of linear combination (λ = 0.5) are given in Table 3.

Table 3. Assessment and ranking of alternative cutting regimes

Alternative	A1	A2	A3	A4	A5	A6	A7	A8	A9
Q	0.325	0.201	0.447	0.376	0.416	0.282	0.349	0.516	0.594
Ranking	5	9	3	6	4	8	7	2	1

From Table 3 it is evident that cutting regime A9 has the first ranking. Hence, combination of intermediate values of depth of cut, feed rate and cutting speed are found to be best compromise solution (optimum combination). It is interesting to note that the second highest ranking has alternative A8, i.e., cutting regime in which all three cutting parameters are set at highest level. Cutting regimes A6 and A9 represent the least preferable cutting conditions for turning of POM-C material.

Chip forms obtained for cutting regime A9 (the most preferred solution) and for cutting regime A2 (the least preferred solution) are shown in Figure 2.



a) a_p = 2.5 mm, f = 0.214 mm/rev, v = 345.6 m/min

b) a_p = 4 mm, f = 0.049 mm/rev, v = 188.5 m/min

Figure 2. Chip forms obtained for different cutting regimes

As could be observed from Figure 2 b), inconvenient (unfavourable) chip form, as a result of very large cross-sectional ratio (ratio of the depth of cut and feed rate), is to be avoided given that chips can be hardly tangled around the workpiece and/or the cutting tool, which creates numerous problems during machining, such as handling and disposing of chips and even machine shutdown, which increases costs (Trifunović et al., 2021).

It is beneficial to check the stability of the ranking of alternatives when solving MCDM problems. This task can be performed in several ways, and in the present study it was performed by varying values of coefficient of linear combination (λ) (Figure 3).

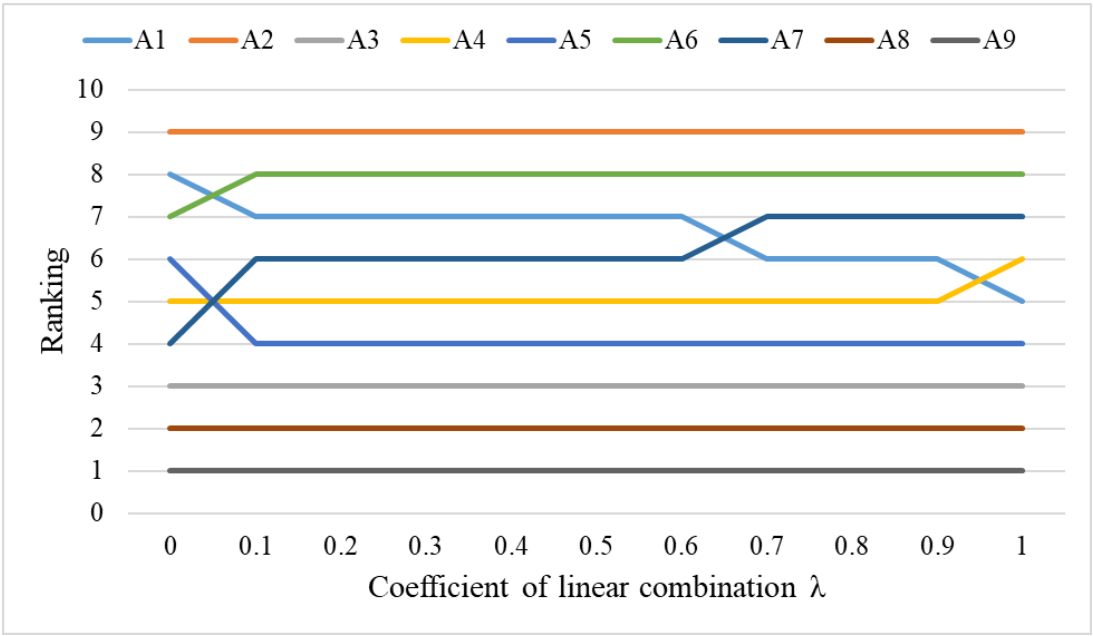


Figure 3. Ranking variation of alternative cutting regimes with respect to λ

From Figure 3 one can observe that rankings of the most and least preferred cutting regimes are stable to perturbations of λ values. With an increase in coefficient of linear combination, cutting regimes A7 and A1 worsen and improve ranking, respectively, while there are no significant changes in ranking of other alternative cutting regimes.

5. CONCLUSION

The present study applied AHP-WASPAS approach for assessment of cutting regimes in turning of POM-C using a PCD tool. Turning experiment, planned as per factorial design 2^3 with central point, considering depth of cut, feed rate and cutting speed, provided a set of experimental data upon which the MCDM model, having four assessment criteria, was developed.

The analysis of results revealed that cutting regimes in which all cutting parameters are set at either intermediate or highest level represent the best trade-off solutions for the present experimental study. The most preferable cross-sectional ratios are obtained for these cutting regimes, ultimately resulting in convenient (favourable) chip form, which was given the greatest importance in the MCDM model, given its multiple significance in turning. On the other hand, the least preferred cutting regimes are those having combination of highest depth of cut (a_p = 4 mm) and lowest feed rate (f = 0.049 mm/rev), thus having a very high cross-sectional ratios (over 80), which result in inconvenient (unfavourable) chip form. The effect of coefficient of linear combination on the ranking performance revealed that there exists strong resistance against rank reversal of the considered alternatives. From a more detailed analysis, which can be performed using design of experiments approach considering a joint criterion of optimality of WASPAS method as response, one can conclude that feed rate has the dominant influence, with positive correlation, on cutting regime ranking position, followed by interaction of the depth of cut and feed rate.

All considered cutting regimes from the proposed MCDM model represent possible picks of process planners given that these are within interval ranges from the recommended cutting parameters values. This study shows, however, that there may be considerable differences regarding different important performances in turning so one needs to carefully consider selection of appropriate cutting regimes for a given task.

Since production requirements often necessitate consideration of opposite requirements, the presented AHP-WASPAS methodology may be receptive for determination of the most adequate cutting regimes in turning. The analysis of obtained results and applied approach may be useful when planning the technological procedure for part machining using the CAM software.

ACKNOWLEDGEMENT

This research was financially supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (Contract No. 451-03-47/2023-01/ 200109).

REFERENCES

Abas, M., Salah, B., Khalid, Q.S., Hussain, I., Babar, A.R., Nawaz, R., Khan, R., & Saleem, W. (2020). Experimental Investigation and Statistical Evaluation of Optimized Cutting Process Parameters and Cutting Conditions to Minimize Cutting Forces and Shape Deviations in Al6026-T9. Materials, 13(19), Article ID: 4327, 21 pages.

Benardos, P.G., Mosialos, S., & Vosniakos, G.C. (2006). Prediction of workpiece elastic deflections under cutting forces in turning. Robotics and Computer-Integrated Manufacturing, 22(5-6), 505-514.

Chatti, S., Laperriere, L., Reinhart, G., & Tolio, T. (Eds.) (2019). CIRP Encyclopedia of Production Engineering. Germany: Springer-Verlag.

Dubey, V., Sharma, A.K., Vats, P., Pimenov, D.Y., Giasin, K., & Chuchala, D. (2021). Study of a Multicriterion Decision-Making Approach to the MQL Turning of AISI 304 Steel Using Hybrid Nanocutting Fluid. Materials, 14(23), Article ID: 7207, 26 pages.

Duc Trung, D. (2022). Multi-criteria decision making of turning operation based on PEG, PSI and CURLI methods. Manufacturing Review, 9, Article Number: 9, 12 pages.

Duc Trung, D. (2022). Multi-criteria decision making under the MARCOS method and the weighting methods: applied to milling, grinding and turning processes. Manufacturing Review, 9, Article Number: 3, 13 pages.

Grzesik, W. (2017). Advanced Machining Processes of Metallic Materials: Theory, Modelling, And Applications, Second Edition. Netherlands: Elsevier.

Khan, A., & Maity, K. (2017). Application of MCDM-based TOPSIS method for the selection of optimal process parameter in turning of pure titanium. Benchmarking: An International Journal, 24(7), 2009-2021.

Krishnaveni, A., Jebakani, D., Jeyakumar, K., & Pitchipoo, P. (2016). Turning parameters optimization using COPRAS – Taguchi technique. International Journal of Advanced Engineering Technology, 7(2), 463-468.

Madić, M., Nedić, B., & Radovanović, M. (2015). Business and engineering decision-making using multi-criteria analysis methods. Serbia: University of Kragujevac, Faculty of Engineering. (in Serbian)

Madić, M., Radovanović, M., Petković, D., & Nedić, B. (2015). Selection of cutting inserts for aluminum alloys machining by using MCDM method. Acta Universitatis Cibiniensis – Technical Series, 66(1), 98-101.

Madić, M., Trifunović, M., & Janković, T. (2022). Development and analysis of a surface roughness model in dry straight turning of C45E steel. Innovative Mechanical Engineering, 1(2), 11-21.

Majumder, H., & Saha, A. (2018). Application of MCDM based hybrid optimization tool during turning of ASTM A588. Decision Science Letters, 7(2), 143-156.

Pathapalli, V.R., Basam, V.R., Gudimetta, S.K., & Koppula, M.R. (2020). Optimization of machining parameters using WASPAS and MOORA. World Journal of Engineering, 17(2), 237-246.

Petković, D., Madić, M., Radovanović, M., & Gečevska, V. (2017). Application of the performance selection index method for solving machining MCDM problems. Facta Universitatis, Series: Mechanical Engineering, 15(1), 97-106.

Radovanović, M. (2019). Multi-objective optimization of multi-pass turning AISI 1064 steel. The International Journal of Advanced Manufacturing Technology, 100(1-4), 87-100.

Rao, R.V. (2007). Decision Making in the Manufacturing Environment Using Graph Theory and Fuzzy Multiple Attribute Decision Making Methods. United Kingdom: Springer-Verlag.

Reddy, V.V. (2020). Turning process parameters optimization of Al7075 hybrid MMC's composite using TOPSIS method. Sigma Journal of Engineering and Natural Sciences, 38(4), 2043-2055.

Saaty, T.L. (1980). The Analytic Hierarchy Process: Planning, Priority Setting, Resource Allocation. United States of America: McGraw-Hill.

Singaravel, B., & Selvaraj, T. (2015). Optimization of machining parameters in turning operation using combined TOPSIS and AHP method. Technical Gazette, 22(6), 1475-1480.

Singh, R., Dureja, J.S., Dogra, M., & Randhawa, J.S. (2019). Optimization of machining parameters under MQL turning of Ti-6Al-4V alloy with textured tool using multi-attribute decision-making methods. World Journal of Engineering, 16(5), 648-659.

Toenshoff, H.K., & Denkena, B. (2013). Basics of Cutting and Abrasive Processes. Germany: Springer-Verlag.

Trifunović, M., Madić, M., Janković, P., Rodić, D., & Gostimirović, M. (2021). Investigation of cutting and specific cutting energy in turning of POM-C using a PCD tool: Analysis and some optimization aspects. Journal of Cleaner Production, 303, Article ID: 127043, 19 pages.

Trifunović, M., Madić, M., Marinković, D., & Marinković, V. (2023). Cutting Parameters Optimization for Minimal Total Operation Time in Turning POM-C Cylindrical Stocks into Parts with Continuous Profile Using a PCD Cutting Tool. Metals, 13(2), Article ID: 359, 19 pages.

Umamaheswarrao, P., Ranga Raju, D., Naga Sai Suman, K., & Ravi Sankar, B. (2019). Optimizing cutting parameters in hard turning of AISI 52100 steel using TOPSIS approach. Journal of Mechanical and Energy Engineering, 3(3), 227-232.

Van Thien, N., Hoang Tien, D., Duc Trung, D., & Nguyen, N.T. (2021). Multi-objective optimization of turning process using a combination of Taguchi and VIKOR methods. Journal of Applied Engineering Science, 19(4), 868-873.

Zavadskas, E.K., Turskis, Z., Antucheviciene, J., & Zakarevicius, A. (2012). Optimization of Weighted Aggregated Sum Product Assessment. Electronics and Electrical Engineering, 122(6), 3-6.

Volume XIX, Issue (1) (2023) 154-164

International May Conference on Strategic Management

POST-PANDEMIC STRATEGY FOR THE 2022 DAY OF THE DEAD FESTIVAL IN MEXICO CITY

Lorenzo Adalberto Manzanilla López de Llergo, Marco Antonio Camarena Cortés*

National Autonomous University of Mexico (UNAM), Mexico

Abstract: This research is part of a series of studies of cultural events and festivals in Mexico. The pandemic derived from COVID-19 in 2020 greatly affected world tourism, especially cultural festivals, which had almost catastrophic consequences when they were canceled in their face-to-face format. The objective is to analyze the actions carried out by the international festival of the Day of the Dead 2022 in Mexico City and propose measures to keep the tradition alive using a Prospective, Interactivity, Strategy, Nuclear, Sustainable and Organization (PIENSO) approach, through of an exploratory, descriptive investigation and with a case method, applying the conceptual frameworks of the microeconomic theories of value chains, governance, institutionalism, resources and capacities, transaction costs and futures studies that allow recommending actions to increase the interest of this event so that people can enjoy both their physical settings and their new virtual settings in the metaverse, which can be accessed from any country in the world.

Keywords: Strategy, case studies, tourism, cultural festivals, Day of the Dead in Mexico

1. INTRODUCTION

This research is part of a series of studies of events, festivals and cultural festivalization in Mexico. Festivals and cultural events are popular celebrations of cultural or religious importance to the host community of the tourist destination (Getz, 1993); They constitute one of the most dynamic and interesting phenomena of cultural tourism, which is considered one of the segments that has grown the most since the 1990s (Richards, 1996). According to Devesa et al. (2009) cultural festivals are living culture (they run out at the same time they are celebrated), reproducible culture (objects related to the cultural theme are derived) and accumulated culture (they are celebrated in historical places or monuments). However, the pandemic derived from COVID-19 caused many cultural festivals in 2020 to be canceled or postponed (Davies, 2020).

Festivals and cultural events have been studied with various ethnological, anthropological, and sociological approaches; In the field of Administration, the interest in studying them lies in evaluating their economic, social and environmental importance for destinations, they had no longer been approached with a strategic approach and with a foundation based on microeconomic theories, which is the current line of investigation of the work team of this study.

The object of study is the international festival of the Day of the Dead 2022 in Mexico City, Mexico, which is the largest mass event in Mexico regarding the celebration of the Day

* *Corresponding author: mcamarena@comunidad.unam.mx*

of the Dead. It was organized by the administration of the government of Mexico City, through the Ministry of Tourism, the Ministry of Culture and other agencies. (SEGOB, 2021)

The general objective of the work is to study the development of the Mexico City Day of the Dead festival that was affected by the quarantine and make recommendations that improve the scope of its objectives using the PIENSO construct and with a case method, applying the conceptual frameworks of the microeconomic theories of value chain, governance, institutionalism, resources and capacities, transaction costs and futures studies, which allows to identify competitiveness, innovative strategies and resource management. An exploratory and descriptive investigation was carried out, beginning with a documentary heuristic search and later field observations in the festivals. In particular, the value chain found in the festival is developed and described, the type of governance it presents, the available resources with their transaction costs and future studies are disclosed.

The interest in studying this massive event in Mexico is increasing, since this type of event suffered more damage in 2020 due to having a restriction on massive events and tourism almost entirely. In addition, it is an activity that, carried out physically, promotes economic activity and spills it over to the destination on the part of visitors and tourists.

In the first place, the referential framework is presented, which includes the background of studies carried out on value chains and governance in festivals and cultural events; secondly, the theoretical framework is presented, in which a brief review of the literature on microeconomic theories is made. Subsequently, in the third part, the method and development of the study are explained; fourth, the results are broken down; finally, some thoughts on the strategy in the international festival are considered.

2. PREVIOUS RESEARCH

In Mexico there are few formal studies about festivals and cultural celebrations that allow decisions to be made about the continuous improvement of public and private projects based on community participation and the conservation of natural and cultural heritage. It is important to mention that tangible and intangible cultural heritage is essential to promote peace and social, environmental and economic development; In addition, it contributes to the revaluation of culture and identity by promoting the sense of collective and individual belonging, and favoring the social and territorial cohesion of a place (UNESCO, 2017). In Mexico, in recent years festivals and cultural events have been studied with the approach of microeconomic theories value chain and governance by Manzanilla et al. (2017), Manzanilla (2018) and there are no other studies that provide a strategic approach for this economic sector.

Among the background to this research, the authors who have approached them with different approaches include the following: Quinn (2005) analyzed the effect of festivals as tourist attractions, Crespi-Vallbona and Richards (2007) studied festivals as vectors for the urban and artistic development, and Moscardo (2008) analyzed the meaning of festivals to enhance society's values, identity development and sense of place. Among the works that study aspects of sustainability and incorporate the application of microeconomic theories and introduce the PIENSO construct, Manzanilla (2017a) in the Malinalco Cultural Festival and the Value Chain of the magical town of Malinalco in the State of Mexico; Manzanilla et al. (2017), Manzanilla et al. (2019) and Manzanilla (2017b, 2018) referring to the festivals and cultural events of Mérida, Yucatán; and González et al. (2017; 2018) for the International Cervantino Festival in Guanajuato.

2.1. Festivals and cultural events

Festivals and cultural events are activities that, under normal conditions (without a pandemic), promote the generation of economic resources because they increase tourism in the destination; the cultural offer favors the continuous arrival of national and foreign visitors and tourists (Getz & Page, 2016). Despite the benefits derived from tourist activity, there may also be various adverse effects in the social, cultural and environmental spheres (Manzanilla, 2016) as in the case of the pandemic, tourism was to blame for the spread of the virus throughout the world. world so rapidly, therefore, it is important to assess the role that cultural activities play in terms of sustainability, by studying the value chain of festivals and cultural events to understand who exercises governance by determining the parameters with which it works, and analyze if the existing institutionalism is sufficient, as well as identify those activities susceptible to scaling (upgrading) by incorporating specific tactics in the strategic design (Gereffi et al., 2005; Seuring & Müller, 2008; Kaplinsky & Morris, 2010; Vera-Martínez, 2016) and an approach with a futures studies approach. The lower transaction costs allow to identify the most scalable activities within the organization.

2.2. Day of the Dead

Recently, the Day of the Dead is considered a hallmark of Mexico in the world, which has been seen as important by various tourist authorities as a great attraction for tourist visitors and for local, national and international inhabitants as a great activator of social interaction in urban spaces (Herrero et al., 2012).

In Mexico, the cult of the dead is very important and there are numerous festivals of the dead that are very particular, due to the differences between each region. The human being frequently reflects on the subject of death and asks himself about transcendence and thinks towards infinity (Ferro, 2018). The Day of the Dead is quite an event, it seeks to remember deceased relatives and an offering is made to them on altars, in addition, this custom is known internationally and is attractive to foreign tourists (Ortega & Arellano, 2018). The celebrations dedicated to the dead represent a privileged moment of meeting not only for men with their ancestors, but also for the members of the community itself (CONACULTA, 2006).

The Day of the Dead festival is a widespread phenomenon in the world and in Mexico in particular. This phenomenon has been studied by anthropologists and ethnologists with a sociological vision, but they have not been addressed from a microeconomic perspective (Williamson, 1989) of the strategic approach to festival planning (Manzanilla, 2006).

2.3. Futures studies

The theory of futures studies makes it easier to observe these elements with the aim of designing a strategy that allows a cultural festival to be held during the pandemic with the intention of subsequent editions. Future studies are something that can be anticipated or created, redesigning the future (Ackoff, 1974) which implies an analysis of globality, complexity, normativity and transdisciplinarity.

2.4. Value chain theory

The value chain was introduced by Porter (1980), Kaplinsky and Morris (2010) and they define it as "the set of links or activities necessary to generate a product or service, from its conception to the final sale or delivery to the consumer, up to the recycling of waste after

use" which also allows identifying who exercises governance of said chain, both through leadership and through control and coercion.

2.5. Resources and capacities

The theory of resources and capacities describes that cultural festivals are determined by their intangible heritage, which is the most relevant, and is supported by the tangible that increases the value of the tourist destination by allowing a level of uniformity to make comparisons between different festivals. A capacity is the ability of a city to perform some activity very efficiently (Thompson et al., 2012), and according to Barney (1991), a resource is a competitive asset of an organization that controls and plans the festivals of a population.

2.6. Transaction costs theory

From the theory of resources and capabilities, holding a cultural festival contributes to reducing the unit transaction costs of a single presentation, while in traditional or specialized festivals, the number of events is lower and their transaction costs unit prices are higher (Herrero, et al., 2012).

2.7. Governance theory

The governance theory refers to the type of leadership, based on Seuring and Müller (2008), to the coordination of activities for the transfer and dissemination of knowledge oriented towards innovation and performance, as well as maintaining competitive advantage. (Frederick & Gereffi, 2009). The ability to actively establish the distribution of risks and benefits in festival participants is coordinated by public and private institutions, through various formal and informal instruments (Gereffi, 2014, Boström et al., 2015), which justifies the analysis of its institutionalism.

2.8. Institutionalism theory

The theory of institutionalism refers to the rules that regulate behavior to reduce conflicts. Traditionally, a conflict has been sought to be resolved in the same place where it was generated. In order to face the dispute and present impartial solutions provided by experts who are not actively involved in the conflict, it is necessary that it be resolved in a different social context (Galanter, 1981). With the elements of institutionalism, the calls, rules, norms and the organizations that apply them, it is possible to analyze the economies of scale and scope that favor festivals and the contribution of sustainability.

2.9. PIENSO construct

The strategic construct PIENSO (Manzanilla, 2006) incorporates the microeconomic elements in the Prospective for the study of futures, which allows considering cooperation as an organizational characteristic that generates expanded capacities and links competition in an Interactive way to define the competitiveness and sustainability of the value chain through its resources. In the Strategy (*Estrategia* in Spanish) to be defined through the Porter, Minzberg and Thompson models, each link is considered the Nuclear unit that defines the functional and operational tactics of the value chain, as well as specifying the strategy, supervision and evaluation of costs. transaction for extended capabilities; finally, the Sustainability approach

is added to the Organization, which must be supported by its governance through its institutionalism to increase its capacities.

Each of the microeconomic theories has a relationship with an element of the construct (PIENSO) as follows:

Table 1. Relationship of the elements of the PIENSO construct with microeconomic theories, own elaboration

	Definition	Microeconomic theory
P	Prospective. Desirable future	Futures studies (possible, probable and preferable sustainable)
I	Interactivity. Competition and Cooperation	Sustainability of the Value Chain and Resources
E	Strategy as lines of action to achieve objectives.	Porter's model, Mintzberg's model, Thmopson's model (2015).
N	Nuclear. Tactics for the achievement of the strategic units of the organization.	The sustainability of the Value Chain and its Transaction Costs
S	Sustainability. Those related are the Sustainable Development Goals	Philosophy and the transcendence of sustainability
O	Organization. The ability to execute the strategy	Governance, Institutionalism and Capacities in favor of sustainability

The use of microeconomic theories allows obtaining a vision focused on the necessary elements to propose a strategy. Due to the above, interest arises in studying the international festival of the Day of the Dead 2022, which was strongly affected by the pandemic and takes place in a metropolis where a great economic spill occurs thanks to this event.

3. METHODOLOGY

This exploratory and descriptive research had an application of the Yin (1981) case method, through the series of studies that have been carried out in recent years to evaluate the development of the events analyzed. It applies as analytical support the microeconomic theory of resources and capabilities and that of transaction costs. It is based on the use of a comparison instrument (approved and pending publication) and for the collection of information the documentary analysis of Cooper and Schneider (2014) and Creswell (2012) was used. The investigation procedure is detailed below:

1. A search was carried out for cultural information regarding cultural festivals available in government documents (national, state and local), as well as festival websites, official social networks and press conferences, among others.

2. From the secondary information, the diagnosis of the components, attractions, services and cultural offer that exists in the Day of the Dead festival in Mexico City was made.

3. Based on the information collected, the direct and indirect actors (people, organizations and companies that participate) were identified.

4. Direct observations were made online through participation and attendance at the festivals.

5. The conceptual framework of the theories of value chain, governance, institutionalism, resources and capacities, transaction costs and futures studies was applied.

6. The validity of the construct was studied in pandemic conditions, with different production of events than usual.

4. RESULTS

Future studies include the analysis of the previous elements that determine the existence of prospective and the possibility of reaching the desirable future. In the same way, the existing elements are evaluated with a scale (Very high, High, Moderate, Low and Very low) that indicates if the element has a definition within the organization and is correctly communicated both internally and externally.

Table 2. Analysis of the necessary elements for future studies, own elaboration

Evaluation	Component
Moderate	Mission
Moderate	Vision
Low	Values
Very low	Scenarios (Optimistic, Logical, Pessimistic)
Very low	SDG 8: Decent work and economic growth
Very low	SDG 11: Sustainable cities and communities
Low	Formal sustainable strategy

In accordance with the execution of a strategy, currently the state government is in charge of the planning, administration and scaling of the links of the festival, while the federal government provides links for broadcast on open television and assurance of preventive health measures, assuming governance; however, previously the cooperation links were established between the value chain of the festivals with the tourism value chain of the locality (Manzanilla, 2017b).

The results indicate that the festival value chain is circumscribed in the intangible heritage link of the local tourism value chain, integrating four links: a) artistic creation and auditions, b) pre-production, c) production and d) exhibition. It was held outdoors and had a digital stage, but participants from the tourism value chain in the destination were not included.

It has captive governance because the state authorities are the lead organization, but the service providers, artists and sponsors are external. Regarding the institutionalism of the festivals, it was identified that it is weak because they do not have visible rules, controls and calls that allow the design of sustainability strategies.

Once it was known how the rules are made and which actors lead the organization, an analysis was made of the available resources and the capacities they currently have, as well as the feasibility of expanding them through the transaction cost as a permanent capacity or through of market acquisition as a dynamic capability.

To describe the resources and capacities of the festival, this scale is proposed, which includes the existing elements to facilitate their analysis and subsequent comparison. It refers to a resource with Very high, High, Moderate, Low or Very low availability according to how sufficient it is for the development of the festival. After analyzing transaction costs, the same scale (Very High, High, Moderate, Low, or Very Low) is used to make it more visible which resources and capabilities can be extended with external resources to achieve dynamic capabilities. A Very Low cost shows a convenient transaction cost for incorporation and acquisition within the organization, a Very High cost refers to a transaction cost that presents

a lower market price against the cost of acquiring and maintaining it, therefore is better through outsourcing (Williamson, 1989:106), a — sign represents too high a transaction cost in any domain to be considered beneficial for festival scaling or an element that does not apply, for example a link Government is a capacity that is not dependent on costs (i.e., it cannot be outsourced).

Table 3. Resources and capacities of the 2022 Day of the Dead festival in Mexico City and analysis of its transaction costs, own elaboration

	Resources	Transaction Costs
The value chain linkage	Moderate	—
Physical resources	High	Very high
Technological and ICT resources	Moderate	Moderate
Financial resources	Very high	High
Human resources	Very high	Very high
Organizational capabilities	Moderate	Very high

Table 4. Technological and ICT resources and capabilities of the 2022 Day of the Dead festival in Mexico City

	Resources	Transaction Costs
Radio and television transmission equipment	Very high	High
Technology on stage	Low	Moderate
Assistive technology at the destination	Moderate	Low
Digital events	Moderate	High
Auxiliary platforms and virtual scenarios	Moderate	High

Since the pandemic, the festival had a high availability of resources dedicated to information and communication technologies, however, it is important to use them to align with the strategy and expand capabilities. A forward-looking approach would make it possible to design a more robust strategy.

Through the construct PIENSO, a strategy is proposed that considers the possibility of reaching new audiences, and causing an interest in experiencing them in their different physical and virtual scenarios in future editions. Currently, there is the opportunity to define participation rules to avoid exceeding the carrying capacity in destinations, which in the past has been exceeded as mentioned in other investigations such as that of Cosalá (Ibarra and Velarde, 2016). In the environmental aspect, it is proposed to maintain sanitary measures, care for natural areas and awareness of the use of water, measures that contribute in some way to the sustainable development objectives of the 2030 Agenda (ODS-ONU, 2018).

5. DISCUSSION

Information and communication technologies currently allow people who attend festivals to share their experiences, points of travel, exact moments of the events and the particular vision of each one on social networks and other messaging platforms (Laurell & Björner, 2018), however event organizers still do not take advantage of these platforms to interact with people, so it becomes a cloud of information that cannot carry the same message

abroad. If the organizing committee at a festival directs communication with dynamics in digital media, it can reach more people and achieve a greater sense of belonging.

According to the theory of resources and capabilities (Barney, 1991; Thompson et al., 2012), the Day of the Dead festival in Mexico City has sufficient physical and financial resources, however, applied digital technologies They were really insufficient and they lost the possibility of reaching many more people who were not there physically and there were events such as the opening that were only available at the starting point of the festival, reducing the relevance of the rest of the space on the route and saturating the place of the ceremony.

Richards and Palmer (2010) mention that cultural events complement the attractions of cities and other activities. In Mexico City you can see the conjunction of several festivals at different points to carry out the same celebration theme, however, the importance of virtual environments, supported by information and communication technologies, has been observed, not to be limited to the physical spaces but to expand a city-brand concept that favors it as a local and tourist attraction.

6. CONCLUSION

The instrument and the microeconomic theories used for this study allow us to observe in a timely manner key aspects of a festival to make adjustments and improvements more efficiently. It is also possible to carry out field research and obtain information that can be compared between different events, which, with the support of the PIENSO construct, give rise to a strategy to achieve digital objectives.

Finally, the microeconomic theory of resources and capabilities, that of transaction costs and the PIENSO construct, have a relationship in their components that allow, with a case method, to study the cultural festival of Mexico City. In the festival, a great sense of belonging was identified on the part of the locals and the participants, but it is limited to the people who usually attend the event in person. It is important to integrate digital elements and coordination for virtual dynamics into the strategy to increase the sense of belonging to the event in those who currently do not attend in person and with it the positive image of the event for its preservation. Digital transmissions such as videos and information capsules can be consulted in the future. Integrating QR codes in physical locations that redirect to websites with additional tourist and cultural information can enhance the quality of the attendees' experience. The design of activities in social networks allows directing the communication generated towards the very values of the festival. Showing this and other elements on a properly assembled official website will make it easier for search engines to provide information to people about the event and all these activities in one place. These and other tools can be integrated to improve the integration that digital media have in the Day of the Dead festival in Mexico City.

REFERENCES

Ackoff, R. L. (1974). Redesigning the future. New York, 29.

Barney, J.B. (1991). Firm resources and Sustained Competitive Advantage. Journal of Management, 17(1), 99-120.

Boström, M., Jönsson, A. M., Lockie, S., Mol, A. P. J. & Oosterveer, P. (2015). Sustainable and responsible supply chain governance: challenges and opportunities. Journal of Cleaner Production, 107, 1-7.

CONACULTA, Consejo Nacional para la Cultura y las Artes. (2006). Cultural Heritage and Tourism. Notebooks 16. The indigenous festival dedicated to the dead in Mexico. Conaculta. México. 222 p. (in Spanish)

Cooper, D. & Schindler, P. (2014). Business Research Methods. 12 ed. McGraw-Hill Education, Nueva York. 720 p.

Crespi-Vallbona, M. & Richards, G. (2007). The meaning of cultural festival. Stakeholder perspectives in Catalunya. International Journal of cultural policy, 13(1), 103-122.

Creswell, J. (2012). Educational research. planning, conducting, and evaluating cuantitative and cualitative research. 4 ed. Pearson Education, Inc. 650 p.

Davies, K. (2020). Festivals Post Covid-19. Leisure Sciences, 1-6.

Devesa, F. M., Herrero, L. & Sanz, J. A. (2009). Economic analysis of the demand for a cultural festival. Applied economics studies, 21(1), 137-158. (in Spanish)

Ferro, L. (2018). Artifices of death. Life, death and a day of the Otomi dead. Experimental Anthropology Journal, 18, 43-53. (in Spanish)

Frederick, S. & Gereffi, G. (2009). Value Chain Governance USAID Briefing Paper. Washington, DC: USAID.

Galanter, M. (1981). Justice in many rooms: Courts, private ordering, and indigenous law. The Journal of Legal Pluralism and Unofficial Law, 13(19), 1-47.

Gereffi, G. (2014). Global value chains in a post-Washington Consensus world. Review of International Political Economy, 21(1), 9-37.

Gereffi, G., Humphrey, J. & Sturgeon, T. (2005). The governance of global value chains. Review of international political economy, 12(1), 78-104.

Getz, D. (1993). Festivals and special events. In: Khan, M., M. Olsen and V. Turgut (Eds), VNR´S Encyclopedia of Hospitality and Tourism. pp. 945- 955. Van Nostrand Reinhold, New York.

Getz, D. & Page, S. (2016). Progress and prospects for event tourism research. Tourism Management, 52, 593-631

González, E. L., Guevara-Sanginés, M. & Manzanilla, L. (2018). Value Chain of the Festival International Cervantino. Journal of Tourism and Hospitality Management, 6(6), 259-263. (in Spanish)

González, E. L., Guevara-Sanginés, M., Manzanilla, L. & Martínez, S. (2017). Analysis of the value chains of the International Cervantino Festival as a cultural and tourism industry. Science from the west, 4(1), 44-56. (in Spanish)

Herrero, L. C., Sanz, J. Á., Bedate, A. & del Barrio, M. J. (2012). Who pays more for a cultural festival, tourists or locals? A certainty analysis of a contingent valuation application. International Journal of Tourism Research, 14(5), 495-512.

Ibarra, J. P. & Velarde, M. (2016). The "Magic Towns" program and tourism sustainability; the case of Cosalá and the events “Cosaltazo” and “Cosalazo”. El Periplo Sustentable, [S.l.], n. 31, ago. 2016. ISSN 1870-9036. Available in: <https://rperiplo.uaemex.mx/article/view/4885>. [09-april-2023] (in Spanish)

Kaplinsky, R. & Morris, M. (2010). A handbook for value chain research (Vol. 113). Ottawa: IDRC.

Manzanilla, L. (2006). Chapter 5. Interactive Strategic Business Process for the Sustainability of Organizations (PIENSO), pages. 136-198 in Sustainable Development, New approach to the theory of Administration and Organization, Administration Process, Proposal for Teaching and Research. Doctoral thesis. National Autonomous University of Mexico. 232 p. (in Spanish)

Manzanilla, L. (2016). Governance of the tourism value chain in Mexico, Malinalco and Cozumel. Memories of the XXI International Congress of Accounting, Administration and Informatics, Faculty of Accounting, UNAM. (in Spanish)

Manzanilla, L. (2017a). Strategic administration for the sustainable development of the value chain of the cultural festival of the Magic Town of Malinalco, State of Mexico. VII International Seminar on Tourism, Development and Sustainability. Autonomous University of Nayarit, Nayarit, México. 18-22 September 2017. (in Spanish)

Manzanilla, L. (2017b). Administration and sustainability of the value chain of festivals and cultural events in Mérida, Yucatán, México. Memories of the XXII International Congress of Accounting, Administration and Informatics, Faculty of Accounting, UNAM. (in Spanish)

Manzanilla, L. (2018). Study of the festivals and cultural events of Mérida, Yucatán, México with the approach of the theory of resources and capacities. XXIII Congress, UNAM, ANFECA, ALAFEC, FCA. (in Spanish)

Manzanilla, L., González, E., & Galindo De la Serna, D. (2017). Value chain as a research tool for festivals and cultural events in Mérida. Memories of the Congress of the Academy of Administrative Sciences, A. C. pp. 2186-2194. (in Spanish)

Manzanilla, L., González, E. L., Ruiz, A., & Camarena, M. A. (2019). Value chain of the magical town Malinalco. Ide@s CONCYTEG, 14(231), 47-59. (in Spanish)

Moscardo, G. (2008). Analyzing the role of festival and events in regional development. Event Management, 11(1-2), 23-32.

ODS-ONU. (2015). Transforming our world: the 2030 Agenda for Sustainable

Development. Available: https://unctad.org/system/files/official-document/ares70d1_en.pdf [09-april-2023]

Ortega, E. & Arellano, M. (2018). Perception of The Day of the Dead in Mexico as a tourist attraction for foreigners (Bachelor Thesis). University of Guadalajara. Guadalajara, México. (in Spanish)

Porter, M. (1980). Competitive strategy: techniques for analyzing industries and competitors. Free Press: New York.

Quinn, B. (2005). Arts festivals and the city. Urban studies, 42(6), 927-943.

Richards, G. (1996). Cultural Tourism in Europe. Oxon: CAB International.

Secretaría de Gobierno (2021). One million people enjoyed the International Day of the Dead Parade. Available: https://www.secgob.cdmx.gob.mx/comunicacion/nota/73-21 [09-april-2023] (in Spanish)

Seuring, S. & Müller, M. (2008). From a literature review to a conceptual framework for sustainable supply chain management. Journal of cleaner production, 16(15): 1699-1710.

Thompson, A. A., Peteraf, M. A., Gamble, J. E. & Strickland III, A. J. (2015). Strategic management, Theory and cases. 19a ed. Mc Graw Hill Education. 534 p. (in Spanish)

Thompson, A. A., Strickland, A. J., Gamble, J., Peteraf, M. A., Martín Rubio, R., … Mascaró Sacristán, P. (2012). Strategic Management: Theory and Cases. México, D.F.: McGraw-Hill Interamericana (in Spanish)

UNESCO, Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (2017). Heritage. Available http://es.unesco.org/creativity/sites/creativity/files/digital-library/cdis/Patrimonio.pdf [09-april-2023]. (in Spanish)

Vera-Martínez, P. S. (2016). Sustainability management in value chains: a theoretical approach. In Memoirs of the XXI International Congress of Accounting, Administration and Computer Science. Faculty of Accounting and Administration, UNAM. (in Spanish)

Williamson, O. E. (1989). The economic institutions of capitalism. Mexico. Fund of Economic Culture. (in Spanish)
Yin, R. K. (1981). The case study as a serious research strategy. Knowledge, 3(1), 97-114.

Volume XIX, Issue (1) (2023) 165-172

International May Conference on Strategic Management

THEORETICAL ASPECTS OF THE CONCEPT OF CORRUPTION

Evaldas Raistenskis*, Anatolijs Krivins, Vitolds Zahars

Daugavpils University, Daugavpils, Latvia

Abstract: After examining the theoretical aspects of corruption, it can be said that corruption is the abuse of authority (office) for personal gain and includes bribery, embezzlement, favoritism, etc. Corruption can also undermine income distribution and lead to neglect of environmental protection in the Green Deal. Decreasing resources due to corrupt actions can have negative consequences for social protection and public services, as it reduces the available budget and disrupts equal access to public services, as well as creating negative conditions for ensuring sustainability and protecting the environment.
The purpose of the article is to analyse various concepts of corruption and present its impact on economy and national budget's revenue. Methods used in the research: analysis of legal acts, scientific comparative analysis of literature.

Keywords: corruption, bribery, embezzlement, nepotism, favoritism.

1. INTRODUCTION

Since ancient times, corruption has been a phenomenon characteristic of society, to which modern democratic and developed countries pay a lot of attention, making efforts to prevent and control corruption. Not only the states themselves, but also international organizations, such as the World Bank, United Nations Organization, Transparency Organization, International Monetary Fund, etc., are concerned about this. Even with the aforementioned initiatives to reduce corruption, this phenomenon is still considered one of the most urgent problems of the modern world (Kaušylaitė, 2009). According to Buinickienė (2017), the phenomenon of corruption is very widespread all over the world, and its consequences cause great damage to the state and its citizens in financial, legal, social, moral and other aspects.

Even in ancient Athens, public inspections were held, the purpose of which was to prevent bribery and palm-greasing of government officials. Corruption undermines good governance and the rule of law, negatively affects the quality and efficiency of services, and threatens the principles of democracy, justice and economics. Countries that can control corruption can use their human and financial resources more efficiently, attract more foreign and domestic investment, and grow faster.

In scientific literature, corruption is presented in different concepts (Drakšienė & Michailovič, 2008; Palidauskaitė, 2010; Akatan, 2015; Dirzytė & Patapas, 2015; Poškevičienė, 2015; Pocienė, 2018; Sherverdayev, 2019; Bahoo et al., 2020; Bahoo et al. 2020), has a diverse nature of classification (Raudonienė, 2003; Piliponyte, 2004; Anders, 2007; Pruskus, 2007; Smorodina, 2021), so it is necessary to carry out a systematic analysis

* *Corresponding author: evaldas.raistenskis@gmail.com*

on these issues in order to understand the true composition and features of the corruption phenomenon.

The aim of the article to determine the concept and peculiarities of corruption. In order to fulfil the main aim, the following tasks were set: to analyse the concept and features of the corruption and to identify the main corruption forms of occurrence from a theoretical point of view. Research methods: analysis of legal acts, review of scientific literature analysis.

2. THE CONCEPT OF CORRUPTION: THEORETICAL CONSIDERATIONS

In the scientific literature (Palidauskaitė, 2010; Akatan, 2015; Pocienė, 2018; Sherverdayev, 2019; Bahoo et al., 2020), there are many and various definitions of corruption. The most used definition of corruption is named as abuse of authority (office) for personal gain (National anti-corruption program of the Republic of Lithuania 2015-2025, 2014). This concept of corruption is used both in the public sector and in the private sector.

The term corruption comes from the Latin word *corruptio*, which means "corruption, bribery". As stated in "Criminology Handbook" (Drakšienė & Michailovič, 2008), due to the complexity of the phenomenon and the variety of forms of expression in modern science, it is doubtful whether it is possible to present a single, all-encompassing concept of corruption. The most commonly used definition given by the international organization "Transparency International" is that it is "abuse of entrusted public power for private gain" (Pocienė, 2018).

As Sherverdayev (2019), Akatan (2015) point out, the concept of corruption generally refers to all actions and behaviors that include bribery, embezzlement, favoritism, etc. It is important to note that "Corruption" is a name that includes certain doubts (mainly bribery, embezzlement, favoritism) and has political features.

The most widely used definition of political corruption in Western politics and law is: "abuse of public power for private gain." The mentioned authors point out that the definition of corruption given by the World Bank and the United Nations is associated with the possibility of public officials to use their positions for profit. Analyzing corruption in his work Sherverdayev (2019) came to the conclusion that the given definition does not explain many issues related to political corruption. Therefore, he distinguishes three types of definitions created at the beginning of the 21st century, which describe different aspects of this phenomenon in relation to politics:

1. Many researchers tend to associate corruption with public services and duties that must be performed when holding the position of a public official (public institution-oriented definitions);
2. Other researchers define corruption through the lens of economic theory, relying on a market-oriented approach (market-oriented definitions);
3. Another segment of scientific findings is focused on the violation of public interest as an irreplaceable element of political corruption (public interest-oriented definitions).

Corruption is usually associated with illegal actions of civil servants in public life sphere, however, the current situation testifies that the manifestations of corruption are extremely relevant in the private sector as well. Definitions of corruption according to the sphere they define in criminological literature are usually divided into definitions in a narrow sense - as phenomena in the public service, limited to the area of state management, executive power, or in a broad sense - as phenomena in private business, commerce, media, politics (Poškevičienė, 2015). Palidauskaitė (2010) emphasizes that corruption manifests itself in various forms and has a tendency to change by adapting to changes in the environment. Corrupt behavior is characteristic of business or government representatives, as well as

individuals and organizations. It can be said that "corruption occurs in countries with different levels of development, even in countries with old democratic traditions" (Palidauskaitė, 2010). The phenomenon of corruption leads to distrust in the rules of society and low trust of citizens in the moral foundations of the state's functioning (Dirzytė & Patapas, 2015).

Palidauskaitė (2010) also states that corruption is defined differently in scientific sources, indicating that "corruption is defined differently not only by individual researchers, but also by international organizations" (p. 24).

Corruption is defined as giving or receiving something when doing things that are not encouraged by laws or other regulations related to certain daily tasks (Mohamed et al., 2014). Corruption is also defined as the abuse of public office for personal gain (Sihombing, 2018).

Bahoo et al. (2020) define corruption as "illegal activities (bribery, fraud, financial crimes, abuse, falsification, favoritism, nepotism, manipulation, etc.) carried out in the public (government) or private (corporate) sectors through abuse government, officials for personal, financial or other benefits". Bahoo et al. (2020) definition of corruption includes three important characteristics of corruption in a business context. First, a person or company engages in some illegal activity. The second is when a person or company abuses power or authority by violating existing rules and regulations or acting outside the bounds of the law. A third characteristic is when a person or company uses a position of power for personal gain (financial or otherwise) rather than benefiting the nation or shareholders. This definition includes all forms of corruption, including bribery, fraud, financial crimes, abuse, falsification, favoritism, nepotism, manipulation and misrepresentation by public or private officials domestically or internationally in social or business contexts in a governmental context.

Akatan (2015) also states that the concept of corruption generally refers to all actions and behaviors that include bribery, embezzlement, favoritism, etc. It is important to note that "corruption" is a name that includes certain doubts (mainly bribery, embezzlement, favoritism) and has political features.

In Article 2 of the Law on Prevention of Corruption of the Republic of Lithuania, prevention of corruption is defined as "the disclosure and elimination of the causes and conditions of corruption by creating and implementing a system of appropriate measures, as well as the impact on individuals in order to deter the commission of criminal acts of a corrupt nature" (Amendment Law No. IX-904 of the Law on Prevention of Corruption of the Republic of Lithuania // TAR, 14/07/2021, No. 15850, current version 01/01/2022).

Beck (2021) found that countries with similar economic structures have generally lower levels of corruption. Corruption is a complex phenomenon with multiple economic, social, political, and cultural dimensions (Gavurova et al., 2020; Yousifir et al., 2020). Corruption also means conflict of interest and favoritism. These forms of corruption require fundamental structural and mental changes in public institutions and society in general, not only in the adoption of legislation and formal compliance with it (Luzgina, 2017). According to Androniceanu et al. (2022), corruption is a phenomenon that emerges and develops in societies and public administration institutions with low digitization, high bureaucracy, weak institutional transparency, and problematic internal and external communication.

3. THE FORMS OF CORRUPTION

Corruption takes many forms, such as bribery, influence peddling, abuse of office, but can also hide behind nepotism, conflicts of interest or revolving doors between the public and private sectors. Its consequences are serious and widespread. Corruption is a threat to security because it encourages crime and terrorism. This inhibits economic growth by creating

business uncertainty, slowing down processes and creating additional costs. Although the nature and extent of corruption may differ in different EU countries, it harms the EU as a whole because it reduces the level of investment, hinders the fair functioning of the internal market and reduces public finances (Corruption, 2021).

When analyzing the concept of corruption, it is important to mention the types of corruption. According to Smorodina (2021), the following types of corruption are distinguished:

- ✓ Corruption in everyday life. This type of corruption results from the interaction between ordinary citizens and officials. This includes various gifts and favors from citizens to the official and his family members. This category includes nepotism.
- ✓ Corruption in business. This type of corruption occurs when the government and business sectors interact. For example, in a business dispute, the parties may seek the help of judges to obtain a judgment in their favor. Another example could be how public procurement takes place between the public and private sector and the services sold are bought by a close person.
- ✓ Corruption in the government. This type of corruption includes the political leadership and the highest courts in a democratic system. It is the practice of politics to some extent where a group of rogue people in power pursues their own interests and undermines the interests of the electorate.

Smorodina (2021) divides corruption into petty corruption, individual corruption, structural corruption and systemic corruption. Petty corruption occurs when corrupt government officials and private individuals interact. Anders (2007) argue that systemic corruption is based on the connections between various government sectors and the state order. According to Public Security (2018) individual or isolated corruption is when corruption occurs infrequently and not across society. Structural corruption is characterized by the fact that society itself knows not only about the possibilities of giving bribes, but also the methods and numbers or actions of bribes for certain processes.

The signs of corruption in the civil service, as well as in the private sector, are harmful to democracy, the economy and the legal system, so the measures to combat it must be consistent, comprehensive and long-term. In order to effectively implement measures to prevent corruption, it is necessary to strengthen the complex elimination of the causes of this negative social phenomenon, enforce the system of law and other state institutions, to promote their closer cooperation with society, as well as non-governmental organizations, to develop civic consciousness and intolerance of existing manifestations of corruption among members of society. A successful fight against corruption is possible only if such a fight is based on elements universally recognized in the world: prevention, investigation of law violations, public education and its support. By implementing these elements as an indivisible whole, positive results can be achieved in order to reduce the prevalence of corruption in both the public and private sectors.

After analyzing the scientific literature on the possibilities of corruption classification, it is clear that corruption can be classified in various ways. The possibilities of classification of corruption systematized by the authors of the work are presented in Fig. 1.

Pruskus (2007) divides corruption into:

1. Black corruption - if representatives of the elite and the majority of the public commit a certain action perceived as corrupt, then it is classified as black corruption.

2. Gray corruption is an intermediate concept, where gray corruption means that there is no clear opinions about actions or opinions can change depending on whether citizens are inclined to punish such actions or not. Some groups, usually elites, view certain behaviors as

illegal and seek to punish them, while other social groups do not. The majority opinion is simply undefined.

3. White corruption - when certain corrupt behavior is tolerated by both the elite and the public the majority. Actions against such behavior are not always supported.

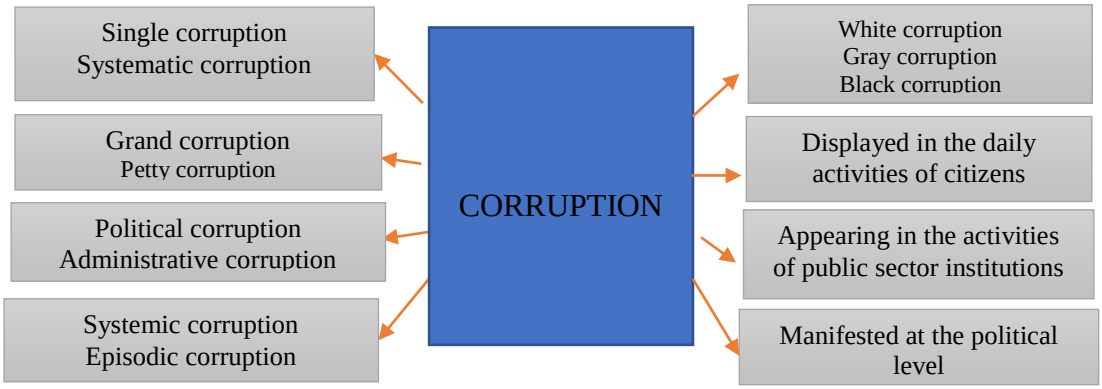


Figure 1. Classification of corruption (Piliponyte, 2004, p. 83)

Raudonienė (2003) presents further division of corruption into episodic (long-term) based on the time criterion and systemic (continuous). Episodic corruption is when honest behavior prevails, a corrupt act being an exception, and when a dishonest civil servant is disciplined after his illegal act was discovered. Systemic corruption occurs when corrupt law violations acquire systemic symptoms, become the norm for the functioning of a person or the entire institution. A third type of corruption could be added to the classification of corruption presented by Raudonienė (2003) - one-time corruption, when a person who has committed a corrupt act once, no longer misbehaves.

The list of corrupt acts is provided by G. E. Caiden, distinguishing the following forms of corruption: disclosure of state secrets, illegal foreign transactions, smuggling, kleptocracy, privatization of public funds, theft, misappropriation, forgery, embezzlement, inflated accounts, misuse of funds, abuse of power, intimidation, torture, undeserved apologies and dismissals, fraud and lying, misrepresentation, cheating and fraud, blackmail, perversion of justice, criminal conduct, falsified testimony, illegal arrest, false accusation, dereliction of duty, parasitism, desertion, bribes and kickbacks, usurpation, illegal fees, election fraud, vote buying, election rigging, misuse of inside and confidential information, falsification of information records, sale of public seats, property, licenses, manipulation of regular purchases and supplies, contracts and loans, tax evasion and gross speculation, purchase of influence or favors, conflict of interest, improper gifts, honoraria, reception of parties, picnics, connections with organized crime, black market operations, favoritism, cover-ups, illegal surveillance, abuse of telecommunications and mail, official stamps, stationery, housing, additional earnings (Palidauskaitė, 2010).

When analyzing prevention of corruption, it also becomes an important concept. As Vian (2020) points out, prevention of corruption includes actions taken to prevent, curb or resist corruption and mitigate its negative effects. Corruption practices can vary by country and context. Consequently, anti-corruption efforts can take many forms depending on the situation (Vian, 2020).

Anti-corruption is the prevention of money laundering and bribery, which is classified as criminal law. As for the prevention of corruption, the contribution of the government is necessary to overcome corruption (Vian, 2020). Applying the Green Deal strategy is one way to reduce corruption in the field of environmental protection.

Analyzing the theoretical aspects of corruption, it can be observed that corruption in the field of environmental protection is associated with political corruption. Corruption is an obstacle to both economic growth and good public administration. Transferring resources outside the economic and social system greatly affects the efficiency of public spending (Androniceanu et al., 2022). Although the EU has shown the best results in the world in reducing corruption over the past year, the costs of corruption to the EU economy reach 120 billion euros per year (European Commission, 2020). Corruption discourages taxpayers from paying taxes (Osipov et al., 2018). Decreasing resources due to corrupt actions can have negative consequences for social protection and public services, as it reduces the available budget and disrupts equal opportunities to use public services (Raišienė et al., 2019; Mazzanti et al., 2020).

Over time, corruption deepens social inequality, reduces trust in the state, institutions and public administration (Cera et al., 2019). Corruption can also undermine income distribution and lead to neglect of environmental protection. One of the most important aspects of corruption in state governance is that it undermines trust in legitimate institutions, thus reducing their ability to provide adequate public services and ensure a favorable environment for the development of the private sector (Mircica, 2020). In extreme cases, corruption can lead to a failure to recognize state legitimacy, leading to political and economic instability (Bilan et al., 2019; Bilan et. al., 2020; Grayson, 2020). Therefore, in order to achieve sustainability in the application of green fuel, it is important to ensure the reduction of corruption.

The European Parliament highlighted many differences between Member States regarding the definition of crime, available indicators and data recording methodology (European Parliament, 2016). Corruption can affect both national and EU policies and funds (Bilan et al., 2017). A recent study estimated that procurement corruption in EU member states costs EUR 5.33 billion euros annually (European Commission, 2020). This means that corruption has become a systemic problem in European countries and requires major changes at various levels, such as governance capacity, education, monitoring and corruption control institutions (Szeiner et al., 2020), legislation, clear access to political and social responsibility criteria, digitization, transparency, etc.

4. CONCLUSIONS

Summarizing it could be concluded that corruption is abuse of authority (office) for personal gain, which includes bribery, embezzlement, favoritism, etc. Corruption can also undermine income distribution and lead to neglect of environmental protection in the Green Deal. Decreasing resources due to corrupt actions can have negative consequences for social protection and public services, as it reduces the available budget and disrupts equal access to public services, as well as creating negative conditions for ensuring sustainability and protecting the environment.

REFERENCES

Akatan, C. (2015). Political corruption: an introductory study on terminology and typology. International journal of social sciences and humanity studies 7 (1), 47 – 65.

Amendment Law No. IX-904 of the Law on Prevention of Corruption of the Republic of Lithuania // TAR, 14/07/2021, No. 15850, current version 01/01/2022.

Anders, G. (2007). Corruption and the Secret of Law: A Legal Anthropological Perspective (M. Nuijten, Ed.) (1st ed.). Routledge. https://doi.org/10.4324/9781315259208

Androniceanu, A., Georgescu, I., & Kinnunen, J. (2022). Public Administration Digitalization and Corruption in the EU Member States. A Comparative and Correlative Research Analysis. Transylvanian Review of Administrative Sciences, 65 E/2022, 5 – 22.

Bahoo, S., Alon, I., & Paltrinieri, A. (2020). Corruption in international business: A review and research agenda. International Business Review, 29 (4), 101660.

Bilan, Y., Hussain, H. I., Haseeb, M., & Kot, S. (2020). Sustainability and Economic Performance: Role of Organizational Learning and Innovation. Engineering Economics, 31 (1), 93 - 103.

Bilan, Y., Mishchuk, H., Samoliuk, N., & Grishnova, O. (2019). ICT and Economic Growth: Links and Possibilities of Engaging. Intellectual Economics, 13 (1), 1 – 12.

Bilan, Y., Gavurova, B., Stanislaw, G., & Tkacova, A. (2017). The Composite Coincident Indicator (CCI) for Business Cycles. Acta Polytechnica Hungarica, 14 (7), 71 – 90.

Beck, K. (2021). Drivers of Structural Convergence: Accounting for Model Uncertainty and Reverse Causality. Entrepreneurial Business and Economics Review, 9 (1), 189 – 208.

Buinickienė, N. (2017). Causes of corruption and their management measures in the health care system of Lithuania. Management Theory and Studies for Rural Business and Infrastructure Development, 39 (2), 148–156.

Cera, G., Meco, M., Cera, E., & Maloku, S. (2019). The Effect of Institutional Constraints and Business Network on Trust in Government: An Institutional Perspective. Administrație și Management Public, 33, 6 – 19.

Dirzytė, A., & Patapas, A. (2015). The paradox of the Lithuanian population's encounter with corruption and satisfaction with life. Public Policy and Administration, 14 (2), 163176 (in Lithuanian).

Drakšienė, A., & Michailovič, I. (2008). Handbook of Criminology. Vilnius (in Lithuanian).

European Commission. (2020). Stepping up Europe's 2030 climate ambition - investing in a climate-neutral future for the benefit of our people. Communication from the Commission SWD (2020) 176 final. Belgium: European Commission. Brussels.

European Parliament (2016). The Cost of Non- Europe in the Area of Organised Crime and Corruption. Access from internet: https://www.europarl.europa.eu/RegData/etudes/ STUD/2016/579319/EPRSSTU (2016)57 9319_EN.pdf

Gavurova, B., Kovac, V., & Khouri, S. (2020). Purpose of Patient Satisfaction for Efficient Management of Healthcare Provision. Polish Journal of Management Studies, 22 (1), 134–146.

Grayson, J. (2020). Big Data Analytics and Sustainable Urbanism in Internet of Things-Enabled Smart Governance. Geopolitics. History, and International Relations, 12 (2), 23 – 29.

Kaušylaitė, J. (2009). Problems of Corruption Prevention and Control in Lithuania. Vilnius: Vilnius University, Department of Sociology.

Luzgina, A. (2017). Problems of Corruption and Tax Evasion in Construction Sector in Belarus. Entrepreneurship and Sustainability Issues, 5 (2), 263 – 282.

Mazzanti, M., Mazzarano, M., Pronti, A., & Quatrosi, M. (2020). Fiscal Policies, Public Investments (4), 725 – 749.

Mircica, N. (2020). Restoring Public Trust in Digital Platform Operations: Machine Learning Algorithmic Structuring of Social Media Content. Review of Contemporary Philosophy, 19, 85 – 91.

Palidauskaitė, J. (2010). The practice of conflict of interest regulation in Lithuania: balancing on the border of private and public interest. Political Science 1(57), 3-39 (in Lithuanian).

Piliponyte, J. (2004). Corruption: theoretical attempts to define and explain it. Sociology, 2, 83 - 95 (in Lithuanian).

Pruskus, V. (2007). Corruption in education: causes and forms of expression. Educology 15 (2), 60 – 72 (in Lithuanian).

Pocienė, A. (2018). Perceptions of corruption among experts, well-informed citizens and ordinary citizens. Studies in Criminology 6, 29-57 (in Lithuanian).

Poškevičienė, J. (2015). Corruption control and prevention in the private sector: theory and practice. Master's thesis. Vilnius. Access from internet: https://vb.mruni.eu/object/elaba:14937373/ (in Lithuanian)

Raišienė, A. G., Bilan, S., Smalskys, V., & Gečienė, J. (2019). Emerging Changes in Attitudes to Inter-Institutional Collaboration: The Case of Organizations Providing Social Services in Communities. Administrație și Management Public, 33, 34 – 56.

Raudonienė, A. (2003). Analysis of categories of corruption. Jurisprudence, 41(33), 81 – 90 (in Lithuanian).

Sherverdayev, S. (2019). Evolution of the concept of political corruption in western and Russian political science and law. Retrived from: https://cyberleninka.ru/article/n/evolution-of-the-concept-of-political-corruption-in-western-and-russian-political-science-and-law/viewer (Accessed on March 25, 2023).

Szeiner, Z., Mura, L., Horbulák, Z., Roberson, M., & Poor, J. (2020). Management Consulting Trends in Slovakia in the Light of Global and Regional Tendencies. Journal of Eastern European and Central Asian Research, 7(2), 191 – 204.

Smorodina, S. (2021). Types of corruption and anti-corruption strategies in Ukraine. Retrived from: https://webcache.googleusercontent.com/search?q=cache:g-6O3z0sCoMJ:https://dspace.cuni.cz/bitstream/handle/20.500.11956/124766/120382731.pdfproc.3Fsequenceproc.3D1proc.26isAllowedproc.3Dy+&cd=1&hl=lt&ct=clnk&gl=lt (Accessed on March 21, 2023).

Sihombing, S. O. (2018). Youth perceptions toward corruption and integrity: Indonesian context. Kasetsart Journal of Social Sciences, 39 (2), 299-304.

Vian, T. (2020). Anti-corruption, transparency and accountability in health: concepts, frameworks, and approaches. Global Health Action, 13, 1694744.

Yousif, N. B. A., Grondys, K., Gad, S., & Elsayed, W. (2020). Knowledge Management in Non-Governmental Organizations (NGOs). Administrație și Management Public, 35, 90–108.

Volume XIX, Issue (1) (2023) 173-183

International May Conference on Strategic Management

ENERGY TRANSITIONS AND POTENTIAL RISKS

Slobodan Radosavljević[1*], Nikola Ille[2], Milan Radosavljević[3], Ivana Radosavljević[3]

[1]RB "Kolubara" d.o.o., Svetog Save 1., 11550. Lazarevac, R. Serbia, [2]The Wolrd Bank, Bulevar Kralja Aleksandra 86-90, 11000, Belgrade, R. Serbia, Washington, United States, [3]GO Lazarevac, Karađorđeva 42., 11550. Lazarevac, R. Serbia

Abstract: Very complex and specific weather circumstances in the world, delegate the need for drastic energetic changes and turns on their own transition paths. Therefore, it is indisputable that the world is going through a difficult energy truth, and the issue of transition paths and circumstances is gaining in importance and topicality. The creation of stable energy flows stems from the positions of high-quality energy mix modeling, which results in an energy practice in real time with constant risks for larger and smaller relations, lags and energy qualitative deviations. Expert opinions that the energy transition is too late are very common. There are numerous reasons that cause this condition. The global flows of international energy strategies, which are different and often variable, especially their interpretation and operationalization, as well as the state of the energy infrastructure at all levels, their differences are certainly recognized as one of the most important in the time that lasts with benefits for the near future. There are evidently large energy losses at the level of all the world's resource potentials. The issue of healthy energy can also be raised here, which is achieved by reaching qualitative positions through greening, capacity and the breadth of the spectrum of general availability and the energy transition culture of a wide range of users. As these are very sensitive strategic and systemic issues, the risk potentials gain particular topicality, relevance and importance. The paper discusses the relations of the energy transition in real time, the existing state, the state in the near future with potential benefits and exposure of the problem scope and thresholds of potential risks.

Keywords: Energy, transition, hybrid energy mix modeling, energy culture, risk

1. INTRODUCTION

All energy potentials should be available, ecologically and socially acceptable for all energy users in the world. The fact is that for now it is not possible to ensure that availability for a whole series of reasons, and this becomes obviously problematic when it comes to the near future. It is also indisputable that energy consumption is constantly increasing, analyzed per consumer by at least twenty times compared to individual consumption in just the last 100 years.

Therefore, the new time with the generation of the most up-to-date different technologies in all areas of life and work leads to new demands of energy users, which are increasingly more sophisticated and brutal. The hunger for energy is unstoppable and growing. While at certain levels and segments part of the world (the world's population) follows all development trends

* *Corresponding author: drslobodanr@gmail.com*

thanks to energy abundance, a good part of humanity is becoming increasingly poor in terms of energy and its inhabitants are deprived of basic standards of well-being and normal living. The mentioned problem leaves almost no room for dialogue and reconciliation in the context of energy well-being.

Energy stability and energy transition are now running as indisputable measures that are almost impossible to simultaneously direct towards a better future. Energy stability implies the configuration of an electrical energy system that fully meets the country's own energy needs. The energy transition means changing the global energy sector from a base in systems driven by the production and consumption of fossil fuels, oil, natural gas and coal, to renewable energy sources such as solar or wind power. The energy transition can also be observed through strategic projections for switching to the use of higher quality energy resources that are renewable and the preventive achievement of the ecological balance of the use of such resource potentials of a country, in accordance with all qualitative criteria and valid standards.

The evident energy crisis as a challenge in the world implies the need for new approaches in solving the open development problems of the energy sector. Energy existence is based on new contents that focus on the choice of new strategies, greening of energy and sustainable development in a broad aspect context. The energy factor is evidently responsible or responsible for the acceleration of large and wide changes in the world, so today it is with reason that global sustainability is most under attack.

2. ENERGY TRANSITION OF RESOURCE POTENTIAL

The energy transition in the world is quite complicated to simplified specifics from higher to lower levels. Its trends more or less move towards higher qualitative thresholds. However, viewed in a macro-aspect context, there are a lot of factors that slow down the mentioned trends at all levels and locations, (Tian et al., 2022).

It is indisputable that this process takes place transparently, but the movement trends are quite undulating, turbulent, and their development path and implementation capacities with a lot of oscillations. Some of the countries in the world are progressing in the energy transition processes, and it is clear that these are the most developed countries that have stable financial support, (Hafner & Tagliapietra, 2020).

The other part of the countries, although with firm determinations for progress, are slowing down to almost periodic stops, given that they are not able to deal with the necessary financial logistics as well as monitoring the most modern technologies that they would like to implement for themselves, or simply do not have the necessary implementation capacity.

There is a part of the countries in the world that is at the very beginning or is just beginning the demanding processes of energy transition. For another part of the countries in the world, the very concept of energy transition is not fully clarified or they do not understand it sufficiently. This means that they are far from starting the mentioned processes, and it can be said that they are in a long time lag. The question is whether and in what way they can make up for it, or will it again enter into even greater energy instability with statements of even greater delay, (Hafner & Tagliapietra, 2020).

The global flows of energy changes are becoming so demanding through energy transition strategies that it is difficult to follow them even from the level of the most developed in the world, and it is only a question for all the others who are evidently late or others who are behind a long time.

One of the questions is how to at least somewhat harmonize the energy transition strategies until the possibility of its final initiation by everyone or everywhere in the world.

For now, it is difficult to answer this question. There are many reasons. First of all, energy turbulences in the world are so great that they drastically affect all processes of life and work. The speed of energy relocations has reached very high thresholds of risk to great confusion and criticality. The price of energy seems to be no longer a factor that everyone is counting on. Some energy moves of the leading countries are often incomprehensible to many (declaration of the reduction or cessation of the use of coal and the construction of new thermal power plants and the closing of existing ones) and in practice a sudden turn to increase the consumption of coal as a fossil fuel and the construction of new coal-fired thermal power plants, (Eyl-Mazzega & Mathieu, 2020).

Energy markets are changing rapidly. The energy road map of countries is so different and turbulent that it causes major energy changes in the world. So much so that the big ones provide and store very affordable energy sources for themselves, unlike others who, due to a series of circumstances, can hardly even access them. The budgets of the countries dedicated to energy are drastically increased by 1 to even 4 times. Although the world is increasingly hungry for the consumption of all types of energy, the current situation still shows trends of a slight slowdown for previously unknown reasons, (Bao et al., 2022).

Qualitative energy mix modeling, even with the most developed, is difficult to interpret/understand and often does not lead to optimal goals and results. For the less developed, it becomes only a dream or a distant chance in the future.

The energy transition, i.e. the transition from an energy mix based on fossil fuels to one that produces very limited, if not zero carbon emissions, based on renewable energy sources, is much needed and represents a tool for achieving the highest environmental goals in the world.

Historically speaking, energy transitions are not new. In the past, we have seen huge changes that marked an epoch. But what distinguishes this transition from its predecessors is the urgency to protect the planet from the greatest threat it has ever had to face, and to do so as quickly as possible, (Bogdanov et al., 2021).

Therefore, despite all the limitations, it is necessary to speed up changes in the energy sector of the world with adequate strategic settings.

It is important to note that the energy transition is not limited only to the reduction of coal consumption as an energy source and the gradual closing of power plants, but also to the development of clean energy. Therefore, it is about a systemic change of the energy paradigm in the world and its newly created configuration, (Svobodova et al., 2021).

When it comes to the largest countries in the world and their behavior in the context of energy transition, one example is China with new approaches and planning projections when configuring and changing its own energy mix, with a contribution to changing the existing energy paradigm in world relations.

Although at the end of 2022. years, China recorded an increase in energy consumption by 2.2% (on an annual basis), it did not make significant changes in its energy mix.

China plans for renewable energy sources to reach 20% of total consumption by 2025. years.

However, the plans of one of the largest countries in the world are presented on a long-term basis until 2060. years through a very demanding structuring of their own energy mix, (by switching from fossil to renewable energy sources).

China now ranks first in the world in terms of investments in clean energy sources. At the same time, in the last decade, around 15 million people have been employed in renewable energy in China.

Two thirds of all the world's plants from renewable energy sources have been built by the beginning of 2023 years in Asia.

Based on the presented indicators, it is indisputable that China certainly has in its hands all the necessary tools, mechanisms and financial logistics to really achieve its energy transition goals within the long-term planned deadlines. Table 1, shows the planned changes in China's energy mix for the period 2025-2060. years. Table 2 shows the installed energy mix of India, (as of February 2023. years).

Table 1. Presentation of planned changes in China's energy mix 2025-2060 years. Source: /Tsinghua University Institute of Energy, China, 2022 years, https://www.ncuscr.org/

Source of energy	2025 years planned projection %	2060 years planned projection %	Change %
Coal	52%	3%	-94%
Oil	18%	8%	-56%
Natural gas	10%	3%	-70%
Wind	4%	24%	+500%
Nuclear power plants	3%	19%	+533%
Biomass	2%	5%	+150%
Solar power plants	3%	23%	+667%
Water	8%	15%	+88%

Table 2. View of Indie's energy installation mix on February 28, 2023 years, (Source: https://powermin.gov.in)

Installed generation capacity(fuelwise) as on 28.02.2023. years, (India)		
Catagory	Installed generation capacity(MW)	% of share in total
Fossil Fuel		
Coal	204,435	49.7%
Lignite	6,620	1.6%
Gas	24,824	6.1%
Diesel	589	0.1%
Total Fossil Fuel	2,36,469	57.4 %
Non-Fossil Fuel		
RES (Incl. Hydro)	168,963	41.0%
Hydro	46,850	11.4 %
Wind, Solar & Other RE	122,113	29.6 %
Wind	42,015	10.2 %
Solar	64,381	15.6 %
BM Power/Cogen	10,218	2.5 %
Waste to Energy	523	0.1 %
Small Hydro Power	4,943	1.2 %
Nuclear	6,780	1.6%
Total Non-Fossil Fuel	175,743	42.6%
Total Installed Capacity (Fossil Fuel & Non-Fossil Fuel)	4,12,212	100%

Comparing the currently existing energy mix of China and India, it can be concluded that China will reach the consumption of fossil fuels in 2025. years at levels that are approximately similar to the current situation of the energy mix in India today. This indicates, considering the great economic activity of China and its influence on the development of the overall world economy, that it is in a more favorable energy transition flow than India. It is realistic that there

are many reasons that cause a delay in the energy transition of India, which will have a harder time keeping up with other countries in the world, (https://www.eia.gov/, 2023).

When it comes to the USA, the energy mix is quite specific and variable. Namely, the USA has only achieved its own energy stability since 2019 years by achieving the goal that, for the first time, energy consumption was lower than production. This has not happened since 1957. years. This trend continues in 2020-2022. years. The energy mix of the USA is such that fossil fuels (oil, natural gas and coal) account for about 79% of total production in the total energy structure. The percentage share in the mix is for: natural gas 36%, crude oil 31%, coal 12%, renewable energy 13% and nuclear energy 8%.

It is important to note that already at the beginning of 2010. years, the gradual reduction of the share of coal in the total energy mix began, and that trend continues in 2022. years, and it is planned to remain so until 2050. years. It can be noticed by comparing the mentioned mixes that the reduction or reduction of coal production and its consumption in the USA was the fastest compared to others.

This does not mean that they are the most successful in the field of using renewable and high-quality energy sources, but it is a fact that they understand and implement the energy transition responsibly, in their own specific way, in accordance with their own characteristics of the total energy potential at their disposal.

3. PROBLEMS OF ENERGY TRANSITION

Most countries around the world have started the energy transition. The question arises as to which direction they must follow in order for their energy transition to be successful. Here, the individual specificities of each of the countries that are unique to them must also be taken into account, (Henderson & Mitrova, 2020). Each of the countries, according to its own specificities and possibilities, observes the issue in question differently, and different national strategies arise from this.

Some of the countries do not have any strategy for the energy transition and are lagging behind more and more, losing pace with participation and possibly their own contribution to the solution of the problem. Some of the remaining countries are in the timing of solving doubts about the general meaning of the energy transition. This is about the poorest and smallest countries in the world, (Child et al., 2018). Therefore, as there are more strategies to the final goal, there are also more scenarios at the global level, in order to successfully implement, improve and constantly upgrade the energy transition. The International Energy Agency published a scenario that would allow our planet to achieve carbon neutrality by 2050 years, (Goldthau et al., 2020). The energy transition implies constant configuration of the most favorable energy mixes. This is a process that is constantly current and has been going on for many years. However, even though the energy mixes were changed very often, the contributions of their constituents were not mutually exclusive, (Singh et al., 2019). Therefore, there were no total transition codes, but they were realized and are taking place gradually, which seems to be the only possible alternative solution. Some of the problems that cause oscillations and limit the global energy transition capacity must be identified and addressed:

- There is no ideal energy mix that will be widely accepted in the world of energy transition by every country, group of countries or at the global level, given the wide range of specificities/diversities, at the price that the ultimate global goal is understandable and that in the final implementation sequences it brings benefit to the whole world.

- Considering the previous statement, it follows that there is no single transition model for the global implementation of the energy transition. Relocation of high-quality energy transition models is needed as soon as possible.
- The energy systems in the world lack too many components for moving faster in the context of changes, and for these reasons the energy transition is significantly slowing down to the point that it is actually a slow process.
- Energy transitions cannot be achieved without new state-of-the-art technologies with the implementation of state-of-the-art technological lines of at least four or five generations, viewed according to the codes of current industrial revolutions.
- Global international scenarios are quite demanding where in some transition sequences small spaces and little time are left, which is far from a realistic assessment, so frequent changes and harmonization with the currently current energy situation in the world are needed here.
- Global international scenarios in the long term, especially until 2050 years, become only wishes based on documented materials, but the potential for their realization is realistically modest or almost unrealizable.
- All countries participating in the energy transition are not in the same starting position for starting the process, at least when it comes to small and underdeveloped countries. They need the help of the big ones to start making changes, or their backlog will be huge, simply because they almost miss the mentioned processes or solve them only partially and partially.
- The world needs different energy transition strategies, given the enormous world energy differences. More frequent changes, additions, and greater flexibility are needed up to the implementation thresholds of acceptance for at least most of the world's countries.
- A large part of the progress in the energy transition is ensured by interventions on the supply side of alternative energy sources. If it is taken into account that fossil fuels still supply more than 80% of the world's energy, the current energy supply will not have the capacity for net zero tolerance. This can be interpreted as a worldwide challenge of the phase of complex and specific uncertainty.
- The complete disorientation and interruptions of supply chains have led to the fact that the foundations of the world's energy systems are seriously threatened. Supply chains are often broken and the time for their re-establishment is difficult to predict.
- Countries face great pressures based on all pillars of the energy transition (economic growth and development, energy sustainability, energy security and non-transparent availability of energy resources).
- A large number of components and issues beyond the borders of the energy transition are not being resolved, and they require and indirectly induce a change in the paradigm of energy strategies and urgent implementation actions.
- Economic and geopolitical uncertainty in the world means that the complete energy transition at the global level enters a phase of uncertainty and ultimate questioning of the direction of further movement.
- Rapid economic changes and the generally unstable security situation in the world show that energy security, even in the best prepared countries of the world (the largest countries in the world), is quite sensitive to even the slightest oscillations and changes.
- Resource access restrictions are very difficult and with major security restrictions and risks causing a domino effect of a strong return to coal-fired power generation in many countries of the world, (https://www-weforum-org, 2023).
- Energy efficiency and energy saving/rational consumption are especially popular now in the world.

- Diversification of the energy mix and import of necessary energy sources and energy, the energy security of many countries in the world can be significantly improved.

4. CRISIS ASPECTS OF ENERGY TRANSITION AND SECURITY

The consequences of the energy crisis, energy security and energy transition can be short-term and long-term. It is quite responsible to consider the short-term consequences considering that in the long term they acquire a special dimension in special circumstances, transformation and multiplication to a wider spectrum of consequences and variability in their own forms and expressions. Major changes in the context of socio-economic effects resulting from energy crises, crisis energy sources, leave a certain space for progress in the energy transition. In order for this to happen, it is necessary to harmonize and trace appropriate responses through immediate interventions with short-term and long-term energy transition goals.

Figure 1, shows energy security in relation to the result of the overall energy transition index in the world, (average 2010-2022 years). Figure 2 shows the possibility of increasing the chances for a successful transition through the diversification of the energy mix at the global level, (2022 years).

Figure 1. Presentation of energy security in relation to the result of the total energy transition index in the world (average 2010-2022 years), (According to: https://www3.weforum.org, 2023 years)

Figure 2. presentation of the possibility of increasing the chances for a successful transition through the diversification of the energy mix at the global level, According to: (https://www3.weforum.org, 2023 years)

Some of the measures and procedures that should be respected, constantly considered with defined necessary improvements are:

- Giving priority to increasing supply from renewable energy sources, keeping fossil fuels limited to set targets.

- Diversification of energy resources and the energy matrix.
- Solve issues of rational consumption of available energy sources and try to optimize the energy mix as much as possible.
- Maximum work on energy efficiency while changing strategies, plans, measures and activities.
- Encouraging responsible behavior when using energy sources in the existing mix, both for legal entities and individuals/consumers.
- Directing part of the profits of large energy consumers to the market in order to ensure the necessary shortage of energy sources and stabilize the current energy mix.
- Regulation of fiscalization and fiscal measures for all energy destruction caused by the crisis. Take care of vulnerable consumers and clearly define who pays for energy and how much.
- Constant coordination and correspondence with regional subjects or beyond, (country level, groups of countries, regional countries and higher organizational distributors/example EU), in order to improve the efficiency of energy consumption and minimize the incurred costs.
- Constant review and improvement of energy strategy, energy security of energy transition flows, taking into account the most advanced technologies, optimal energy mixes and the most positive energy practice, which is offered in the environment from wider to global levels, (https://www3.weforum.org, 2023).

5. RISKS OF THE ENERGY TRANSITION

The energy crisis that has gripped the world in a certain sense again, (from a short-term point of view), includes a more aggressive position of fossil fuels, especially coal, so that the cycles in the total balances began to turn in completely opposite directions from those previous periods in which qualitative parameters were sought and which would undoubtedly be generated by the global energy transition. The world's hunger for energy and energy resources has increased in recent years. Thinking and planning have become almost very fast from long-term to short-term, in a short time and for achieving mostly only own and not wider to global goals. However, it is realistic to ask how small countries can amortize the resulting impacts or, in the case of energy independence, jump out of the currents of the world energy transition.

A number of countries, thanks to the position of their fossil energy reserves, can balance their own energy mixes even in newly created circumstances while maintaining economic dynamics and to the extent that the country functions without major negative economic turbulence. It is a matter of time how long it will last and when the normalization process of returning to the initiated flows of the global energy transition begins. Each energy mix exhibits high risk thresholds in its functional streams. Even under conditions of optimization of all the energy components that make it up, the problem is its balancing. In the newly created circumstances, this problem is compounded multiple times due to very different bases of influence, and functionality risk thresholds can be extremely high, even to the extent that they reach certain risk maxima, which are situations when certain factors of the energy mix jump out, leading to the complete collapse of power systems. Such events are not unknown to a large number of countries in the world. The consequences are major disruptions in all spheres of life and economic work, growth and development, which greatly affects the generation of the country's overall negative economic flows. Major risks in the energy transition are caused by the impacts of the configuration of non-standard and standard/hybrid energy mixes. In energy crisis situations, one can hardly even talk about putting together optimal energy mixes, (Radosavljević et al., 2013; Radosavljević et al., 2017).

It is very demanding to put together an optimal hybrid energy mix for the reason that the parameters of the delegated mix composition express certain specificities in the system of operation/use of energy sources as parts of the mix. Some energy sources in the mix at certain moments can significantly limit the set realization of functions and modes, which undoubtedly leads to the limit of partial/complete stoppages, dropouts, jumps to total system breakdowns. In such circumstances, the controlling system with multidisciplinary control teams must be extremely operable, so that such situations can be detected and rehabilitated in time, in the sense that the operable system is constantly active and reliable. As, depending on the composition of the energy hybrid mix, there are energy inputs into the system from multiple sources and from different energy sources, the situation is further complicated and the risks of high thresholds are delegated, which must be reduced to a lesser or greater extent through controlling and activities and gradually brought to acceptable thresholds. It must be said that here there is a constant fluctuation/oscillation of the level of risk thresholds. It is necessary to carry out a complete detection of them, decompose them and procedurally foresee the necessary activities for their reduction or high-quality monitoring of their oscillations in order for the energy mix in the systems to function reliably. Since there is no ideal hybrid energy mix, precautionary measures/analysis and monitoring are very necessary at all times and for the entire time the system is functioning. The risk analysis on only one energy source entering the energy mix and energy balance, with only one parameter and its deviations in terms of qualitative characteristics shows that even after taking the necessary procedural measures in the first/second/x interaction of the analysis, the risk still remains within the limits high thresholds and that these types of systems are generally high risk, caused by risky configured energy mixes,

Further flows of energy transition in many countries of the world in the next 10 years will undergo significant shifts and changes, sometimes in favor of some energy sources in relation to others, contrary to the qualitative transition flows and their requirements, and somewhere by activating some other energy potentials and continuing with active energy transition in own original configuration modes and models. (Radosavljević et al., 2009; Radosavljević et al., 2022).

6. CONCLUSION

The energy transition in the world is proceeding slowly and unevenly at the global level. Abandoning fossil fuels is a really demanding and brave undertaking, but it looks quite problematic for the future. The change in the energy mix at the global level does not seem to exclude fossil fuels so quickly, even in some circumstances they will be increased during the duration of the world energy crisis. This is especially characteristic of countries that are small and have weak energy potential. The energy transition will probably be further slowed down in some countries for a while or even stopped, until the overall energy situation normalizes. The benefits generated by the energy transition will be from everyone for everyone on a global level. There are very high risks in all aspects related to the energy transition, both at the global and down to the micro level of countries, especially smaller and energy insolvent ones. Despite all the turbulent energy circumstances that will befall the world, it is to be expected that the energy transition will continue with a better arrangement of energy mixes in the world. The problem remains that each country arranges its energy mix in accordance with the global energy strategy, plans and defined roadmap for implementation.

REFERENCES

Bao, K., Bieber, L.-M., Kürpick, S., Radanielina, M.H., Padsala, R., Thr¨an, D., & Schr¨oter, B. (2022). Bottom-up assessment of local agriculture, forestry and urban waste potentials towards energy autonomy of isolated regions: example of R´eunion. Energy Sustain. Dev. (66), 125–139.

Bogdanov, D., Ram, M., Aghahosseini, A., Gulagi, A., Oyewo, A. S., Child, M., & Breyer, C. (2021). Low-cost renewable electricity as the key driver of the global energy transition towards sustainability. Energy, 227, 120467.

Child, M., Koskinen, O., Linnanen, L., & Breyer, C. (2018). Sustainability guardrails for energy scenarios of the global energy transition. Renewable and Sustainable Energy Reviews (91), 321-334.

Eyl-Mazzega, M. A., & Mathieu, C. (2020). The European union and the energy transition. The geopolitics of the global energy transition, 27-46.

Goldthau, A., Eicke, L., & Weko, S. (2020). The global energy transition and the global South. The geopolitics of the global energy transition, 319-339.

Hafner, M., & Tagliapietra, S. (2020). The geopolitics of the global energy transition (381). Springer Nature.

Hafner, M., & Tagliapietra, S. (2020). The global energy transition: A review of the existing literature. The geopolitics of the global energy transition, 1-24.

Henderson, J., & Mitrova, T. (2020). Implications of the global energy transition on Russia. The geopolitics of the global energy transition, 93-114.

Radosavljević, S., Dašić, P., Ille I., Radosavljević M., & Radosavljević J. (2017). Possibility managed by technical systems in mining with artficicial intelligence and robotics with risk analyzes, 17th International Conference "Research and Development in Mechanical Industry", RaDMI-2017, 73-87.

Radosavljević, S., Dašić, P., & Radosavljević, M. (2013). Appendix specifics of risk management in mining. Metalurgia International, 18 (8), 59-68.

Radosavljević, S., Lilić, N., Ćurčić, S., & Radosavljević, M. (2009). Risk assessment and managing technical systems in case of mining industry. Strojniški vestnik, Journal of Mechanical Engineering, 55 (2), 119-130.

Radosavljevic, S., & Radosavljevic, M. (2009), Risk assessment in mining industry - Apply management. Serbian Journal of Management, 4(1), 91-104.

Radosavljević, S., Ille, N., Radosavljević, M., & Radosavljević, I. (2022), Coal as a sustainable resource of serbia and risk potentials of world energy needs for energies, International May Conference on Strategic Management-IMCSM22, (1), 310-320.

Singh, H. V., Bocca, R., Gomez, P., Dahlke, S., & Bazilian, M. (2019). The energy transitions index: An analytic framework for understanding the evolving global energy system. Energy Strategy Reviews, (26), 100382, 4-9.

Svobodova, K., Owen, J. R., & Harris, J. (2021). The global energy transition and place attachment in coal mining communities: Implications for heavily industrialized landscapes. Energy Research & Social Science, (71), 101831, 4-5.

Tian, J., Yu, L., Xue, R., Zhuang, S., & Shan, Y. (2022). Global low-carbon energy transition in the post-COVID-19 era. Applied energy, (307), 118205, 3-9.

Internet sources

https://www-weforum-org. (2023). Internet reference, access 06/04/2023, 8 pm.

https://www.ncuscr.org/. (2022). Internet reference, access 07/04/2023, 6 pm.

https://powermin.gov.in/. (2023). Internet reference, access 08/04/2023, 8 am.

https://www.eia.gov/. (2023). Internet reference, access 06/04/2023, 11 am.
https://www-weforum-org. (2023). Internet reference, access 08/04/2023, 09 am.

Volume XIX, Issue (1) (2023) 184-193

International May Conference on Strategic Management

NEW ASPECTS OF INDUSTRIAL REVOLUTION 5.0, SOCIETY 5.0 AND RISKS

Slobodan Radosavljević[1*], Nikola Ille[2], Milan Radosavljević[3], Ivana Radosavljević[3]

[1]RB "Kolubara" d.o.o., Svetog Save 1., 11550. Lazarevac, R. Serbia; [2]The World Bank, Bulevar Kralja Aleksandra 86-90, 11000, Belgrade, R. Serbia, Washington, United States; [3]GO Lazarevac, Karađorđeva 42., 11550. Lazarevac, R. Serbia

Abstract: The world at the global level is facing great challenges across the entire spectrum for the possibilities of further development and advancement in a multifaceted context. In general, some dilemmas arise, how successful are we in implementing all scientific determinations confirmed so far in all spheres of life and work? Therefore, progress has undoubtedly been generated, partly applied through the implementation practice, but it seems that it is about such a wide scientific area, which humanity needs to master, that in certain moments it leads to general global concern. How successful we are or how successful we can be questions are to which there are many different answers, ranging from pessimistic to optimistic forecasts and predictions. Even today, even though there are disagreements in the answers, we can clearly state the differences between Industry 4.0 and Industry 5.0. Industry 4.0 has laid the foundation for human/machine collaboration, as well as machine-to-machine collaboration and connectivity between the factory, logistics, supply chain management and the end user. All this is incorporated into Industry 5.0 by integrating human creativity and robotic precision, with the aim of creating a unique solution, which will be the demand of the next decade. As the world is undergoing intense transformational flows, the question is how much this can slow down further development steps on the way to the 5.0 industry. One of the important questions is: the road map, the practicum of the operationalization of the determination and the generation of the risk volume for both industrial revolutions.

Keywords: Industrial revolution 5.0, Society 5.0, industrial practicum, robotics, risk

1. INTRODUCTION

The past time (ten years), can be characterized as the time of Industry 4.0. Major disruptions in the world, especially since 2021. years, have almost called into question, generally speaking, the basic postulates of the industrial revolution up to that time. Such sudden and specific situations brought the world almost to an instant knockdown.

At that time, it can be said that the world did not have quick answers in critical situations, which to a significant extent caused the disintegration of the conceptual solutions of work processes and industry in general, which were considered modern until then.

[*] *Corresponding author: drslobodanr@gmail.com*

This is one of the most difficult situations in which the world has found itself, although throughout the history of all industries there have been other events that significantly jeopardized the process progress in question.

It was a moment of re-examination of the world economy and a very clear determination that the industry must be reorganized very quickly, so that life and work could continue to exist, as much as is acceptable for the duration of the crisis period.

It has been shown that the crisis will be of a long-term nature and that everyone definitely cannot follow the very fast and demanding changes that time puts and tests them on a global level. It is a time when industry 4.0 is more limited than ever before.

The adoption of rapid changes in system input parameters with a high degree of flexibility are the most characteristic features of Industry 4.0. Therefore, quick reaction, quick responses in the industry are a condition for its survival in the market in general.

This was exactly the situation for chain reactions and additional confusion that was created in what we thought were high-quality industrial processes until then. It turned out that the industry reacted much more slowly to the answers that were delegated to it as an algorithm for transformations, recovery and business, than in previous industrial revolutions.

These are undoubtedly more than clear signals that changes are needed, but also questions about how to preserve the qualitative industrial performance that was achieved until then.

The latest researches are not unknown, which point out that now and in the future Industry 4.0 and 5.0 should be analyzed simultaneously, and that Industry 5.0 should be understood as a qualitative superstructure of Industry 4.0 (Adel, 2022).

The time of industrial revolutions is drastically reduced, which is interpreted by the development of new system codes and the speed of implementation forms in the industrial global sector.

Therefore, the overall world industrial development, regardless of the current problems and undoubtedly determining the delay in the industrial revolution 4.0 and 5.0, is expected to enter and accelerate in the shortest possible period of time, all industrial transformation forms and flows. Considering the constant expansion of the borders of global industrial forms, the risks generated are increasingly complex and their controlling and multidisciplinary analysis and analytics in the context of reducing and bringing them to acceptable thresholds are increasingly difficult (https://blog-isa-org, 2023).

2. SOME ANALYTICAL PARAMETERS OF INDUSTRY 4.0 AND INDUSTRY 5.0

At the time of the great transformation flows that the world has started, the industry of the future and the society of the future appear as a great opportunity, it is Industry 5.0 and Society 5.0. While the European Commission announces Industry 5.0 in the direction of a sustainable, humane and stable/resilient European industry, the Japanese government proposes Society 5.0, with the aim of balancing economic progress and solving social problems in Japanese society, (Jianxiao et al., 2023).

If this is viewed in general, the industrial revolution and the social revolution have been interacting with each other since the beginning of the industrial revolutions in general.

In the information society (Society 4.0), the cross-sector exchange of knowledge and information was not enough, and cooperation was quite difficult. Therefore, the promotion of efficiency and flexibility of production is given a higher priority here in relation to industrial sustainability and the general well-being of workers, (Longo et al., 2020).

Technology-driven Industry 4.0 provides the concepts of rapid technological change, industrial change and social patterns and processes for it, artificial intelligence and a new digital system.

Industry 4.0 promotes the efficiency and quality of production to a higher level with the emergence and development of big data analytics, a solution for industrial design focused on man and his cooperation with robots in a random environment and in a random place.

Industry 5.0 is gaining more and more attention, and the goal is to respond to the challenges presented in Industry 4.0, (Xu et al., 2021).

The solution of the subject problems in the current society, which is declared as a futuristic/super smart society, in which everyone can live in a high quality and comfortable life through the combination of cyber and physical space fully using information communication technologies. It can be said that industry 5.0 and society 5.0 are almost two parallel concepts for future industry and society. Society 5.0 is human-centered that balances economic progress with solving social problems through a system that highly integrates cyberspace and physical space.

So in Japan, Society 5.0 is proposed in the basic plan of science and technology as the future society that Japan should strive for, (https://www.japan.go.jp).

In Society 5.0, a huge amount of information from sensors in physical space accumulates in cyberspace. In cyberspace, this big data is analyzed by artificial intelligence, and the results of the analysis are fed back to the people in the physical space in various required forms.

It is clear that the environment of Japan and the world are in a time of drastic and rapid changes.

In the face of such great changes in the world, new technologies such as information, robotics, artificial intelligence and big data, all of which can affect the course of society, continue to advance, (Di Nardo et al., 2021).

Japan strives to make Society 5.0 a reality as a new society that incorporates these new technologies into all industries and social activities while simultaneously achieving economic development and solutions to social problems, (https://www.japan.go.jp).

As the economy grows, life becomes prosperous, demand for energy and food increases, life expectancy increases, and an aging society thrives. In addition, the globalization of the economy is progressing, international competition is becoming more intense, and problems such as wealth concentration and regional inequality are growing. It can be said that the environment surrounding Japan and the world is in an era of drastic changes. The social problems that have to be solved in opposition (as a compromise) with such economic development are becoming more and more complex.

Various changes have become necessary here, such as: reduction of greenhouse gas emissions, increased production and reduced losses of food products, reduction of costs associated with an aging society, (Maddikunta et al., 2022).

In Society 5.0, the new value created through innovation will eliminate regional, age, gender and language differences and enable the provision of products and services adapted to different individual needs and latent needs. In this way, it will be possible to create a society that can both promote economic development and find solutions to social problems. Achieving such a society, however, will not be without its problems, and Japan intends to face them head-on with the goal of being the first country in the world to present a model of future society as a country facing challenging issues (Atsushi, 2021).

According to the definitions of Industry 5.0 and Society 5.0, a systematic comparison is made in order to better understand their relationship and interconnection. There is a noticeable logical similarity and differentiation between Industry 5.0 and Society 5.0 from four dimensions, including goals, values, organization and technology. Industry 5.0 can only be

understood as attempts by strategists and planners of economic development to preserve the concept of industrial economy for generations yet to come, in a dramatically threatened life context compared to the one that gave birth to the industry and in which the industrial revolution took place, (https://www.industrija.rs/, 2023).

Based on geographic analysis, the global industry 5.0 market has already been segmented into five major regions including North America, Europe, Asia Pacific, Latin America, and the Middle East and Africa region. Industry 5.0 is a model of the next level of industrialization characterized by the return of manpower to factories, distributed production, intelligent supply chains and hyper customization, all aimed to deliver a tailored customer experience time after time. The future for Industry 5.0 includes the manufacture of robots, including industrial robots, with improved artificial intelligence and cognitive computing technologies to improve efficiencies and speed of delivery, while at the same time allowing people to focus on other areas. (https://www.twi-global.com/).

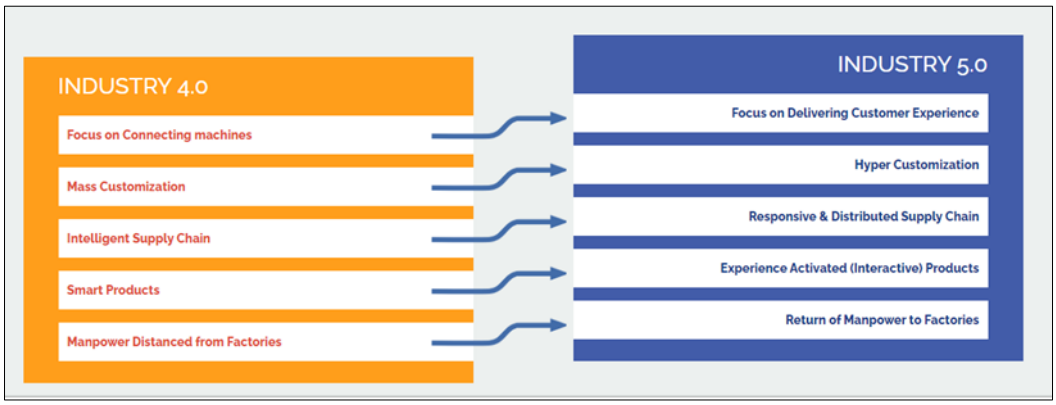


Figure 1. Comparison of the most important features of Industry 4.0 and Industry 5.0, (https://mitsubishisolutions.com/industry-5/)

Figure 1 shows a comparison of the most important factors of Industry 4.0 and Industry 5.0, according to: (https://mitsubishisolutions.com/industry-5/).

3. GOOD AND BAD SIDES OF INDUSTRY 5.0

In the previous part of the work, a comparative application of industry 4.0 and industry 5.0 was presented. The main difference is the focus on adding a human touch to machines AND using new smart technologies to better empower workers in the workplace. Industry 5.0 is a new step in the development of smart industry, but on the other hand, it can be said at the same time that this concept is anti-industrial in many ways, (https://www-clarify-io).

Therefore, Industry 5.0 puts the focus back on people, not machines. Using the knowledge within the people working in the company has a really untapped potential. It should focus more on techniques and solutions that will increase trust in factory workers and realize the value that exists there, (Leng et al., 2022).

The impact on the environment, including the impact on planet Earth and our society, is also very relevant. Today, customers are increasingly aware and make decisions taking into account the impact of business on the environment. In order to hire high-quality young talent, companies must also demonstrate that they take their environmental impact seriously, (https://www-clarify-io).

Industry 5.0 can be understood as the attempts of strategists and planners of economic development to preserve the concept of industrial economy for generations yet to come, in a

dramatically threatened life context compared to the one that gave birth to the industry and in which the industrial revolution took place.

The vision of Industry 5.0 could be presented according to the following definitions:

- Increased focus on the integration of human workers and machines in manufacturing as well as other industrial environments.
- Shifting focus from robots that replace humans to robotic solutions and smart machines that support and augment human work.
- Repositioning human manufacturing workers from assembly line processes and other repetitive tasks to more creative jobs that require problem solving, experience and intuition.
- Moving away from excessive automation and recognizing its shortcomings.
- Moving towards finding a more balanced approach for optimized robotic manufacturing processes of the future.
- Focusing on user experiences and mass customization of smart products for consumers.
- Building smart, responsible and distribution supply chains.
- Design and manufacture of smart interactive consumer products.
- Solving potential security risks and vulnerabilities of modern interconnected industrial automation systems.

Industry 5.0 puts the collaboration of people and machines at the center of the new industrial revolution. Human-machine interaction technologies are intended to support human workers and combine their unique abilities with the power of machines.

Some of the human-machine interaction technologies are:

- Collaborative robots that work alongside and assist human workers.
- Virtual reality and augmented reality (for industrial testing, staff training and inclusiveness.
- Advanced work tools and safety equipment, enhancing human capabilities with robotic tools and data connectivity.
- Automatic recognition of human speech and gestures.
- Increasing the cognitive abilities of human workers using artificial intelligence and other innovative technologies.
- Devices for monitoring the health and psychological state of workers.
- Digital twins and simulations.

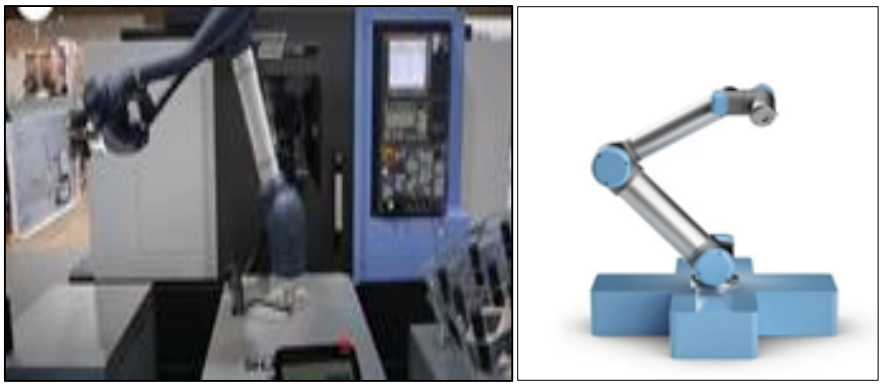


Figure 2. Display of collaborative robots intended for direct human-robot interaction within a common space, for Industry 5.0, (https://qviro.com/product/universal-robots/)

Figure 2, shows collaborative robots of the latest generation intended for direct human-robot interaction within a shared space.

The robots shown are for smart technology and smart production of Industry 5. (https://qviro.com/product/universal-robots/).

Every industrial revolution so far has had its advantages and disadvantages.

Some of the benefits of Industry 5.0:

- Increasing productivity and efficiency of production,
- Reduction of human physical work,
- Creation of new jobs,
- Reduction of production time,
- Increasing creativity in business processes.

Future jobs will be in the area of:

- Smart technologies,
- Artificial intelligence,
- Robotics.

Although Industry 5.0 is a step forward, it is not perfect and therefore has its drawbacks.

With the opening of new jobs comes the need for education in order to make them work places could be filled. Here there is a problem of the ethical behavior of artificial intelligence.

With the arrival of robots in workplaces, man is forced to learn to work alongside robots.

Exists the possibility that they will compete in the work and the question of whether the robot will do the job better but a man? It is difficult to predict the ethical aspects of working with robots because a robot is not needed rest, has no ambition and is unable to lie. It is necessary to determine the ethical status robot in a random environment.

Man will have to learn to work with several types of robots that they may not be able to understand, for example, mimicry, gesticulation, (Huang et al., 2022).

According to research, the biggest fear of the arrival of robots is the loss of jobs. If robots start taking over jobs, there will be a negative perception of robots. On the other side, there is a possibility of job losses, but the arrival of robots will also create new jobs.

Despite relatively slow adoption rates, the transition to Industry 5.0 has already begun. And it is in the general collective interest that society and the business environment come closer to this vision of self-aware and resilient industrial automation, (https://www-clarify-io/).

Being able to effectively collect and use industrial data is essential for any company striving for automation in the Industry 5.0 era.

In the transition to the environmentally friendly and sustainable automation paradigm envisioned in Industry 5.0, organizations will need data more than ever before. And with that comes a lot of new problems. How to organize large amounts of data? Who should do it? Where to store them?

How to standardize the data and where (if the data is obtained from several sources)? How to collect and track temperature information about specific machine parts and compare this information with data from other machines, (Fazal et al., 2022).

What if the machines come from several different manufacturers? What if the machines are labeled differently? In order for the principles of Industry 5.0 to work in a real business environment, it is necessary to find answers to these and many other questions.

As the market for industrial automation technologies continues to grow, new smart products emerge and new companies emerge, grow and evolve, trying to solve the problems addressed in the Industry 5.0 concept. None of the companies see themselves in the ideal personification of the implementation strategy on the platform of the Industry 5.0 concept, but

as a subject on the market with the possibility of great flexibility and learning from others (competitors and consumers of smart products).

4. SOCIETY 5.0 AS A NEW CONCEPT

Society 5.0 is a super-intelligent society that integrates technologies such as artificial intelligence, the Internet, big data and robots in every social line.

Specifically, Society 5.0 aims to build an intelligent society by creating a super intelligent social service platform that will create new values by collaborating with several different systems to facilitate human work. Society 5.0 is the basic plan of the fifth technology and science as a future society, which is a vision of Japan that should be built on society 4.0 and aims for a super society? With the concept of society 5.0, Japan has introduced digital technology for various systems and accelerated its implementation in order to dynamically achieve a society in which all citizens are included, (Huang et al, 2022).

The Japanese government wants to build a society in which all citizens, including young and old people, women and men, people with disabilities and people with disabilities with severe illnesses, can live satisfactory lives and show their full potential, that is, a society in which all citizens they participate dynamically, (https://www8.cao.go).

The system revolution will innovate the Internet of Things, big databases, robots and artificial intelligence on automated driving, healthcare, financial transactions, construction, agriculture, forestry, fishing and tourism. The use of the Internet in education changes traditional teaching in practice and brings changes in the infrastructure of educational institutions. In Society 5.0, the new value created through innovation will eliminate regional, age, gender and language differences and enable the provision of products and services finely tailored to different individual needs and latent needs. In this way, it will be possible to create a society that can both promote economic development and find solutions to social problems, (https://www.researchnester.com).

Achieving such a society, however, will not be without its problems, and Japan intends to face them head-on with the goal of being the first country in the world to present a model of future society as a country facing challenging issues. In the previous society, priority was generally placed on social, economic and organizational systems, which resulted in gaps in the products and services that individuals receive based on individual abilities and other reasons. In contrast, Society 5.0 achieves an advanced convergence between cyberspace and physical space, allowing big data-based artificial intelligence and robots to perform work and adjustments that humans have so far done, (https://www.japan.go.jp).

This frees people from everyday cumbersome jobs and tasks they are not particularly good at, and through the creation of new value enables the provision of only those products and services that people need at the moment when they really need them, thus optimizing the entire social and organizational system.

This is a society centered on each person, not a future controlled and monitored by artificial intelligence and robots.

Achieving Society 5.0 with these attributes would enable not only Japan but the world to achieve economic development while solving key social problems.

It would also contribute to meeting the Sustainable Development Goals set by the United Nations, (Huang et al, 2022).

Japan aims to become the first country in the world to realize a human-centered society (Society 5.0) where everyone can enjoy a high quality of life full of energy.

It intends to achieve this by incorporating advanced technologies into various industries and social activities and encouraging innovation to create new value.

5. RISK OF THE SOCIETY 5.0 AND INDUSTRY 5.0 CONCEPTS

During the implementation of the concept of Society 5.0 and Industry 5.0 on explicit system productions, the determination of the implementation dilemma and in the functional flow of the process and specific operational problems will certainly appear. The generation of risks of different thresholds is inevitable in newly created productive circumstances and in a broad aspect context, (Main, 2015).

Therefore, in the environments of a super smart society, smart companies, smart factories and obtained the most qualitatively categorized super products, the assessment, identification, processing and minimization of all the total generated risks, most certainly gets a new approach, new analytical formats on the overall platform of making a smart product as in the qualitative as well as in a quantitative context.

So, now risk analysis is becoming an extremely important segment of the smart industrial platform. A particular problem arises when identifying hidden risks that can have equally high thresholds and that are difficult to perceive, detect, define and place in analytical codes for consideration, (Radosavljević et al., 2009).

This is about changing the risk paradigm, where these businesses apply/apply to the levels of both Society 5.0 and Industry 5.0 as accompanying risk formats.

All digital risk analysis tools known so far must be totally redesigned for new times, new circumstances, new knowledge and smart products. This should result in a new generation of smart digital tools and smart software systems for risk analysis.

Risk analysts are faced with the challenge of new times and rapid development where they too will have to follow such dynamics through transformational formats and constant learning, (Radosavljević & Radosavljević, 2009).

The promoters of Society 5.0, (Japan) and especially Industry 5.0, more than about 95 countries in the world are already creating the necessary preliminary models and digital formats for risk analysis, which will respond in the best possible way to new times and new smart requirements, (Radosavljević et al., 2022).

Time already shows that it is possible to quickly count on smart digital system platforms, models and modes for risk analysis, with which a person, with the application of artificial intelligence, i.e. joint work (human and robot), would more accurately, comprehensively, quickly and qualitatively follow all analytical formats risks that could be generated in the new circumstances of smart production. Risk analysis and its positioning with an assessment of threshold height, reduction, potential minimization or control possibilities will certainly bring great benefits to smart companies, so that they can be as competitive as possible on the market with their smart products and smart services. It is especially important to emphasize education and the creation of quality multidisciplinary teams for risk analysis for new circumstances, new times and a new risk future, (Radosavljević et al., 2013).

One of the ways for smart companies to ensure relevant risk monitoring in their smart processes is to educate themselves the necessary profiles of their own multidisciplinary teams for the relevant risk analysis tasks, which they need depending on the form and scope of their own production of smart products. In any variant solution, multidisciplinary smart risk analysis teams must have their own evolution through constant learning and improvement. At the same time, in their work they use all digital forms and tools that are incorporated on the common smart platform of Industry 5.0 and Society 5.0.

Risk analysts must be in the processes and parts of the processes of smart companies or smart factories, they must know the production-technological configuration in detail, so that they can safely and quickly detect risks, monitor, analyze them, prepare responses to them by maximizing and minimizing risks to the greatest extent possible, (Radosavljević et al., 2013).

Analysts (multidisciplinary teams) of risk certainly have a constant need to follow contemporary analytical trends of change and to take on new smart transformational forms themselves, for the time coming in the near and distant future. Their locality on the vertical level can be variable and on the horizontal level it must be constant.

When analyzing risk, it is important that it is aligned with industry-specific or non-industry-related rules. It is essential for the successful assurance of quality risk analysis and the comprehensive management of the quality of risk analysis.

Accordingly, it is necessary to ensure the compliance of smart digital software products with the latest versions of applicable standards, regulations and recommendations from various industries, which should be continuously monitored and constantly updated.

6. CONCLUSION

Industry 5.0 is focused on the interaction between humans and machines/robots. Human-robot collaboration combines human creativity and skill with the speed, productivity and precision of robots to create new commercial and social value.

Industry 5.0 is more humane, it brings back the human touch, i.e. people in production. This work concept is primarily for medium and small companies, where complete automation is neither possible nor profitable, and market demand is increasingly demanding products tailored to the customers' wishes.

In large manufacturing companies, there are technological operations that are not profitable to automate, or the automation is very complex, so this form of work of robots and workers is the most profitable.

Society 5.0 is a new paradigm of smart development that reaches the required breadth of implementation based on Industry 4.0 to the potential of a smart society. It follows that such characteristics can be realized in the future on a global level, World Society 5.0. It is undeniable that, no matter how you look at it, Industry 5.0 can also represent relatively cheaper solutions in production where it is not profitable to introduce a high level or complete automation. The concept of Company 5.0 could potentially be a new incentive for the fastest possible practical implementation of Industry 5.0.

The time of implementation capacities in the world for these new concepts and the benefits they will generate will determine in a certain sense the fate of further development possibilities of smart companies, smart factories, smart products and smart society in the near and distant future.

REFERENCES

Adel, A. (2022). Future of industry 5.0 in society: human-centric solutions, challenges and prospective research areas. Journal of Cloud Computing 11 (40).

Atsushi, D., Chiaki, H., Hideyuki, M., Taku, N., Kohei, O., Mitsuharu, Tai., & Shigeyuki, T. (2020). What Is Society 5.0? In: Society 5.0. Springer, Singapore.

Di Nardo, M., & Yu, H. (2021). Special issue "industry 5.0: The prelude to the sixth industrial revolution". Applied System Innovation, 4 (3), 45.

Fazal, N., Haleem, A., Bahl, S., Javaid, M., & Nandan, D. (2022). Digital management systems in manufacturing using industry 5.0 technologies. In Advancement in Materials, Manufacturing and Energy Engineering, Vol. II: Select Proceedings of ICAMME (2021). 221-234. Singapore: Springer Nature Singapore.

Huang, S., Wang, B., Li, X., Zheng, P., Mourtzis, D., & Wang, L. (2022). Industry 5.0 and Society 5.0-Comparison, complementation and co-evolution. Journal of manufacturing systems, (64), 424-428.

Jianxiao, W., Feng, G., Yangze, Z., Qinglai, G., Chin-Woo, T., Jie, S., & Yi, W., (2023). Data sharing in energy systems, Advances in Applied Energy, (10), 100132.

Leng, J., Sha, W., Wang, B., Zheng, P., Zhuang, C., Liu, Q., Wuest, T., Mourtzis, D., & Wang, L. (2022). Industry 5.0: Prospect and retrospect. Journal of Manufacturing Systems, (65), 279-295.

Longo, F., Padovano, A., & Umbrello, S. (2020). Value-oriented and ethical technology engineering in industry 5.0: A human-centric perspective for the design of the factory of the future. Applied Sciences, 10 (12), 4182.

Maddikunta, P. K. R., Pham, Q. V., Prabadevi, B., Deepa, N., Dev, K., Gadekallu, T. R., & Liyanage, M. (2022). Industry 5.0: A survey on enabling technologies and potential applications. Journal of Industrial Information Integration, 26, 100257.

Main, W. B. (2015). Risk Assessment challenges and oportunities, Working Paper. Arbor (Michigan - USA), 231-235.

Radosavljević, S., Lilić, N., Ćurčić, S., & Radosavljević, M. (2009). Risk assessment and managing technical systems in case of mining industry. Strojniški vestnik - Journal of Mechanical Engineering, 55 (2), 119-130.

Radosavljević, S., Ille, N., Radosavljević, M., & Radosavljević, I. (2022), Industry 5.0 and risks in the world of the future, International May Conference on Strategic Management-IMCSM22, (1), 321-330.

Radosavljević, S., & Radosavljević, M. (2009). Risk assessment in mining industry - Apply management. Serbian Journal of Management, 4 (1), 91-104.

Radosavljević, S., Dašić, P., & Radosavljević, M. (2013). Appendix specifics of risk management in mining. Metalurgia International, 18 (8), 59-68.

Radosavljević, S., Dašić, P., & Radosavljević, M. (2013). Individual maintenance engineering in energy and mining-based of risk. Metalurgia International, 18 (6), 79-86.

Xu, X., Lu, Y., Vogel-Heuser, B., & Wang, L. (2021). Industry 4.0 and Industry 5.0-Inception, conception and perception. Journal of Manufacturing Systems, 61, 530-535.

Internet sources

https://blog-isa-org, (2023), (Internet reference, Access 03/03/2023, 8 pm).

https://www8.cao.go.jp/cstp/english/society5_0/index.html, /https://www.cao.go.jp/. (2022). (Internet reference, Access 04/04/2023, 9 am).

https://www.industrija.rs/, Transition of heavy industry to clean energy, (2023). (Internet reference, Access 14/04/2023, 2 pm).

https://www.researchnester.com/reports/industry-50-market/3603, (2023). Global Industry 5.0. Market Regional Synopsis**.** (Internet reference, Access 06/04/2023, 4 pm).

https://www.twi-global.com/, (2022). (Internet reference, Access 06/04/2023, 3 pm).

https://mitsubishisolutions.com/industry-5/, (2022). (Internet reference, Access 06/04/2023, 8 am).

https://www-clarify-io/, (2022). (Internet reference, Access 07/04/2023, 6 pm).

https://qviro.com/product/universal-robots/, (2022). (Internet reference, Access 06/04/2023, 10 pm).

https://www.japan.go.jp - pdf - society_5.0.pdf/. (2022). Realizing Society 5.0, (Internet reference, Access 08/04/2023, 9 am).

Volume XIX, Issue (1) (2023) 194-201

International May Conference on Strategic Management

CHALLENGES OF EMERGING TECHNOLOGIES - SMALL SATELLITES AND HAPS PLATFORMS

Damir Ilić[1], Tatjana Ilić-Kosanović[2], Isidora Milošević[3*]

[1]School of Engineering Management, Serbia; [2]School of Engineering Management, Serbia; [3]University of Belgrade, Technical faculty in Bor, Serbia

Abstract: This paper aims to provide a brief retrospective of the possibilities of both small satellites and HAPS platforms and to answer the question of which solution would have the more significant potential for possible application in the near future. The paper provides a theoretical framework to consider the possibilities of applying both solutions. In order to conduct the analysis, the analytical hierarchical process was used. Decisions were made based on key criteria that have a significant impact on the applicability of the systems. The study showed that HAPS platforms represent a system that offers greater application possibilities compared to small satellites in the near future. The reason is based on the fact that, with further advances in technology, HAPS platforms have the potential to represent a genuinely multipurpose system capable of successfully performing a wide range of missions at relatively low costs.

Keywords: Satellites, Small satellites, HAPS, AHP method, Usability

1. INTRODUCTION

Thanks to the dynamic progress of technology (which primarily refers to the IT sector), we are witnessing a general trend of miniaturization and reduction of satellite manufacturing costs. Certainly, the most popular form of satellites is small satellites, which are divided into several groups based on mass. Advances in technology also have a major impact on the development of another type of machine embodied in HAPS platforms. Satellites and HAPS have the potential to be a major competition to each other in the field of providing numerous services in the years to come. Both systems have its advantages and disadvantages and due attention will be paid to that aspect during the analysis.

At this stage of the technological development of human civilization, it is more than obvious that small satellites have primacy. We are talking about the present moment, devoid of looking at the very near future. What will be a challenge is the time yet to come where attitudes are formed based on a broader picture and a deeper perspective. Therefore, this paper aims to provide a brief retrospective of the possibilities of both small satellites and HAPS platforms and to answer the question of which solution would have the greater potential for possible application in the near future.

[*] *Corresponding author: imilosevic@tfbor.bg.ac.rs*

2. SMALL SATELLITES

According to the orbits they use, satellites can be categorized into geostationary, medium or low orbit satellites (GEO, MEO and LEO). Geostationary satellites move at a speed that is aligned with the Earth's rotation at an altitude of 35,000 km. the satellite is therefore at a fixed location in the sky relative to a potential observer on the ground. Low (orbit less than 2.000 km) and medium Earth orbit (orbit ranging from 2.000 to 35.000 km) use satellites that move relative to some fixed point on Earth. Orbits can be equatorial, polar or inclined - that is, the satellite can use a combination of each (GSMA, 2022). During 2015, there were about 1,100 active satellites and about 2,600 that are no longer operational. The role of GEO satellites is mainly reserved for communication needs or TV program transmission. MEO satellites are mainly used to provide navigation services to their users. The remaining part is made of LEO satellites, the number of which has increased radically in recent years, and their missions include weather-observing missions, scientific missions, communication missions, Earth observation and imaging missions (Sebestyen, et al., 2018). Unlike medium or large-sized satellites, which are complex both to manufacture and to place in orbit, small satellites offer the possibility of an easier launch and they are an affordable solution. The dramatic growth in the number of small satellites embodied in so-called swarms increases the complexity and imposes great challenges before regulatory bodies such as the United Nations (UN) and the International Telecommunication Union (ITU). Namely, a large number of satellites (measured in the thousands) requires the allocation of certain frequencies and orbital slots, as well as when it comes to geostationary satellites (Nair, 2019). A rapid increase in the number of small satellite constellations will result in a sharp increase in space debris. Accumulation of the aforementioned waste represents a major threat to the safety of space exploration and exploitation and has a major impact on the environment (Yang & Wu, 2022). There is also a possibility of misuse of small satellites for the realization of criminal and terrorist activities (Nair, 2019). Table 1. shows the classification of minisatellites based on their mass.

Table 1. Classification of small satellites in terms of mass (Nair, 2019)

Classification of small satellites in terms of mass		
Satellite class	Mass range	Functionality
Femtosatellite	10-100 g	In swarms
Picosatellite	100 – 1000 g	In swarms
Nanosatellite	1 – 10 kg	Individually & in groups
Microsatellite	10 -100 kg	Individually & in groups
Small satellite	100 – 500 kg	Individually & in groups

There is no international agreement regarding the definition of the term small satellite. All satellites are grouped into categories based on their mass. The International Telecommunication Union considers that satellites whose mass does not exceed 500 kg can be considered “small satellite”. Space agencies (NASA, ESA, JAKA, CSA and others), as well as numerous industries and research institutions have accepted the technology of small satellites due to the possibility of realizing cheap and fast missions. Their missions include Earth observation, atmospheric science and space weather, astronomy, telecommunications, mission operation and technology, biology, astrobiology, pharmaceutical research, etc. (Koudelka, 2016). Further focus will be on micro, nanosatellites, and their capabilities.

The use of microsatellites is based on a large number of satellites of small dimensions and mass compared to standard satellites and orbiting at heights of approximately 1200 km

above Earth. In terms of communication microsatellites are characterized by low latency, the possibility of covering the entire earth's surface (when they are used in larger number), as well as the possibility of fast transmission. Microsatellites have enabled real-time observation of the earth's surface in better resolution and have led to the availability of completely new services (Kinjo, 2016).

Any satellite whose mass ranges from one to ten kilograms, can be considered a nanosatellite (Majumdar, 2022). The first nanosatellites were launched in the period from 1958 to 1968, and during that time they represented experimental satellites whose primary role was to, apart from testing new technologies, provide insight into relevant data about living conditions that prevail in low Earth orbit. The miniaturization trend of nanosatellites continued from 1968 to 1996, resulting in the emergence of active nanosatellites and eventually leading to CubeSats in 2003, which, at a cost of $50,000–$300,000, enabled universities and small space companies to participate in satellite exploration projects. The trend of nanosatellite launches has seen exponential growth since 1997, with Trent closely resembling Moore's Law, with the number of ships launched doubling every 2.44 years (Janson, 2020). CubeSat is by its characteristics a nanosatellite. The standard CubeSat dimensions are called a unit (U). The dimensions of each unit are 10x10x11 cm. CubeSat size can be 1U, 2U, 3U or 6U. The mass for 1U is slightly less than 1.33 kg (Mohammed Chessab Mahdi, 2018). Regarding the use of launched CubeSats, 48% are used by commercial companies, 40% are used by universities, while 12% are used by government institutions (Eddine Kerrouche et al., 2022). In March 2018 The US Federal Communications Commission (FCC) has approved SpaceX's request regarding the launch of 4,425 LEO satellites, which represents the first phase of almost 42,000 satellites which should be in orbit. And other companies follow the trend like OneWeb with 2,720 satellites, Amazon with 3,236 satellites and Samsung with 4,600 satellites (Suwijak & Shouping, 2021).

3. HAPS

HAPS are autonomous, unmanned aerial vehicles that fly or hover at heights of about 20 km. These are autonomous systems that have the ability to be stationed and the ability to take off and land gives the systems the ability to change their configuration or to perform maintenance (GSMA, 2022). High-altitude platforms, or pseudo-satellites (HAPS), are a type of airborne platform that possesses the capability to mimic the performance of satellites at the local level (Gonzalo et al., 2018) HAPS includes several types of platforms. These aircraft include balloons, free-floating balloons, dirigibles, or powered fixed-wing aircraft that use either solar power or an on-board power source. It is important to note that all systems are unmanned (GSMA, 2022). Balloons are aircraft of low mass and power, and they are characterized by low payload. Fixed-wing platforms have more mass, power and the ability to fly longer than balloons. They can be precisely placed in the desired location. Airships are physically the largest platforms, with greater capabilities in terms of power carrying capacity and flight autonomy. as well as fixed-wing aircraft offer the possibility of precise positioning (GSMA, 2021). The HAPS platform is characterized by the possibility of local coverage of a certain part of the territory, a relatively fast positioning procedure as well as the possibility of very fast transmission (Kinjo, 2016). The application of HAPS platforms covers the whole range of missions, but those that potentially bring the greatest benefit are related to telecommunications, Earth observation, GNSS or scientific applications. The implementations of HAPS projects are accompanied by certain technological problems. Primarily a structure that is sensitive to turbulent and windy environments as well as limited load capacity. When it comes

to HAPS aircraft embodied in the form of Airships, there are problems related to the production and handling of very large parts of the structure. (Gonzalo et al., 2018).

Compared to satellites, HAPS have certain advantages. They are primarily reflected in the form of less signal delay, less path loss, less pseudo range errors and provide the possibility for continuous coverage to reduce the number of receptions for users in the part of the territory over which the aircraft is located (Zheng et al., 2023). There are limiting factors when it comes to the need to use HAPS platforms. Despite certain advantages compared to nanosatellites and microsatellites, there are also serious obstacles to their further commercialization. In the first place, we are faced with technological barriers, then with barriers embodied in terms of legislation that regulates the commercial application of UAS and the third reason lies in the allocation of commercially available radio frequency bands in the stratosphere (Kinjo, 2016). The successful materialization of HAPS requires the full integration of existing and new technologies in order to make aircraft operations feasible and profitable. There are also challenges in solving problems related to communication systems. It should be emphasized that HAPS projects are a large capital investment that requires large human resources and costs (Widiawan & Tafazolli, 2007).

Projects of HAPS platform prototypes implemented so far that have served as technology demonstrators include aircraft such as: SHARP, Pathfinder, Centurion &Helios, SkyNet, CAPANINA, X-station, Elevate, Loon, Zephyr S, Aquila, Stratobus, HAWK30 and PHASA-35 (Kurt et al., 2021). Currently available platforms under development include HAPSMobile, Sceye, Stratobus, Stratomast and Zephyr (GSMA, 2022). Table 2. shows the characteristics of HAPS platforms that are in different stages of development.

Table 2. Some of the characteristics of HAPS demonstrators (GSMA, 2022)

HAPS	First test flight	Weight and dimensions	Endurance time	Cruising altitude / Speed	Primary application
HAPSMobile	2020	Wingspan:78m	Several months	20 km / 110 km/h	Communication; Disaster relief; IoT;
Sceye	2016	N.A.	N.A.	18-20 km / N.A.	Telecommunications; GHG emissions monitoring; Natural resource surveying, mapping, monitoring, etc.
Stratobus	Expected 2024	10.000 kg / 140 m long with 32 m diametar	Up to 1 year	18-20 km / 20 m/s	Intelligence; Surveillance and Recognition; Disaster relief, etc.
Stratomast	2020	4.000 kg / wingspan 56 m	6-9 days	18 km / 277,8 km/h	Neutral host mast in the sky
Zephyr	2010	75 kg / wingspan 25 m	26 days / next generation 6-12 months	18 – 20 km	Connectivity; Other secondary connectivity applications: Earth Observation.

4. MARKET VIEW

According to current reports concerning the small satellite market, there is a prediction that the global market will be four times larger in 2028 than it was in 2021. This growth was embodied in an increase from $5.8 billion to $22.9 billion during that period for a compound annual growth rate (CAGR) of 22.2% (Taylor, 2022). By 2030, there is a need to launch 11,746

small satellites for the new constellation and to replace the existing ones that are no longer in operation. 97.7% of the total mass launch demand will be generated by commercial operators, with the largest contributions such as Space X, EarthNov and Oneweb. 37 small satellite commercial operators will generate more than 90% of the demand for small satellite launches (Frost & Sullivan, 2019). Rocket Lab is using its Electron rocket in 2018 to launch small CubeSats into Earth orbit. Rocket Lab charges $5 million per flight for its service, which equates to a cost of about $10,000 per pound of payload. SpaceX charges about $62 million per launch for the same services using its Falcon 9 rocket, or about $1,200 per pound of payload to reach low Earth orbit (Chow, 2022).

5. ANALYSIS OF PREDOMINANCE IN TERMS OF USE

For the purposes of analysis, the existing situation in the field of small satellites and HAPS platforms will be taken into account, as well as the development trends of both technologies. Table 3. shows the characteristics of GEO, MEO, LEO satellites and HAPS platforms.

Table 3. Some of the characteristics of GEO, MEO and LEO satellites and HAPS (GSMA, 2022)

System	Satellite for global coverage	Timer per orbit (hours)	Time in site per gateway	Latency: RTT (ms)	Mass (kg)	Lifetime (years)
GEO	3	24	Always	600/700	~3500	15
MEO	10-30	5-12	2-4 Hours	<150	~700	12
LEO	100+	1.5	15 minutes	<50	5-1000	<5-7
HAPS	/	/	Always	<10	<320 Balloon <100 Aircraft	>5 Balloon >8 Aircraft

The Analytic hierarchy process (AHP) as a decision making model, developed by Saaty (1980) and decision making software Expert Choice (Expert Choice, n.d.) will be used for the analysis.

Table 4. Global importance of criteria that have an impact on the system

Criteria	Global importance of criteria
Maturity of technology	0.028
Signal coverage	0.078
Signal quality	0.064
Legislation	0.217
Allocation of commercially available radio frequency	0.204
Implementation costs	0.050
Adaptability to perform different missions	0.112
Interfering with other research endeavours	0.035
System reliability	0.103
Risk of possible misuse	0.110

Global importance of criteria shown in Table 4. is presented in form of matrix W3:

$$W3 = \begin{bmatrix} 0.028 \\ 0.078 \\ 0.064 \\ 0.217 \\ 0.204 \\ 0.050 \\ 0.112 \\ 0.035 \\ 0.103 \\ 0.110 \end{bmatrix} \quad (1)$$

Importance of alternatives (systems) compared to criteria can be presented in form of matrix W4:

$$W4 = \begin{bmatrix} 0.833 & 0.750 & 0.833 & 0.200 & 0.500 & 0.250 & 0.800 & 0.750 & 0.250 & 0.667 \\ 0.167 & 0.250 & 0.167 & 0.800 & 0.500 & 0.750 & 0.200 & 0.250 & 0.750 & 0.333 \end{bmatrix} \quad (2)$$

Matrix of importance of alternatives is then calculated and presented in form of matrix:

$$W = \begin{bmatrix} \text{HAPS} \\ \text{Satellites} \end{bmatrix} = W4 \times W3 = \begin{bmatrix} 0.508 \\ 0.492 \end{bmatrix} \quad (3)$$

The importance and ranking in terms of usability according to the AHP methodology was presented in Table 5.

Table 5. Ranking of the systems based upon AHP methodology

System	Weight	Rank
HAPS	0.508	1
Small satellites	0.492	2

6. CONCLUSION

It is quite certain that in terms of technology maturity, legislation, implementation costs, and system reliability, small satellites have the advantage. When we talk about signal quality, signal coverage, and adaptability to perform different missions in terms of interfering with other research endeavors, the risk of misuse is possible, and the advantage is on the side of the HAPS platform. In both cases, big problems can be expected regarding the allocation of commercially available radio frequency. Despite the usability benefits of the HAPS platform, it faces two major challenges. The first concerns legislation and the second concerns is about reaching the necessary level of technological development in order for the platforms to show their full potential. The problem with the legislation is primarily related to the fact that HAPS platforms would have to share the same airspace with other aircrafts, but their flight zone would include the stratosphere, or rather, they would operate at twice the altitude used by civil aviation. When we are talking about the level of technical development, most HAPS platforms at this stage of development are demonstrators. However, time is undoubtedly on the side of the HAPS platform, thanks to the great potential that is just waiting to be fully exploited. What should be emphasized when it comes to small satellites is the fact that with an increase in their number,

there is an enormous increase in space debris, which can radically increase the probability of collisions between objects (and lead to Kessler syndrome) and greatly affect outer space activities (Steinkogler, 2016). Overall, taking into account all the mentioned factors and certain conditions that must be met, HAPS can be considered as a very useful universal platform in the years to come. In the analysed scenario, the focus is on the competitiveness between the two systems. The mentioned analysis in no way calls into question the existence of a scenario that would include certain interoperability between those two technologies.

ACKNOWLEDGMENTS

The research presented in this paper was done with the financial support of the Ministry of Education, Science and Technological Development of the Republic of Serbia, within the funding of the scientific research work at the University of Belgrade, Technical Faculty in Bor, according to the contract with registration number 451-03-47/2023-01/ 200131.

REFERENCES

Chow, D. (2022). To cheaply go: How falling launch costs fueled a thriving economy in orbit. NBC News. Retrieved February 24, 2023, from https://www.nbcnews.com/science/space/space-launch-costs-growing-business-industry-rcna23488.

Eddine Kerrouche, K. D., Seddjar, A., Khorchef, N., Bendoukha, S. A., Wang, L., & Aoudeche, A. (2022). CubeSat project: experience gained and design methodology adopted for a low-cost Electrical Power System. Automatika: Journal for Control, Measurement, Electronics, Computing & Communications, 63(4), 695–717.

Expert Choice (n.d.) Expert Choice solutions. Retrieved February 26, 2023, from https://www.expertchoice.com/2021.

Frost & Sullivan (2019). Small-satellite Launch Service Revenues to Pass $69 Billion by 2030. Retrieved February 19, 2023, from https://www.frost.com/news/press-releases/aerospace-defense/small-satellite-launch-service-revenues-to-pass-69-billion-by-2030/.

Gonzalo, J., López, D., Domínguez, D., García, A., & Escapa, A. (2018). On the capabilities and limitations of high altitude pseudo-satellites. Progress in Aerospace Sciences, 98, 37–56.

GSMA (2021). High Altitude Platform Systems. Towers in the Skies. Retrieved January 5, 2023, from https://www.gsma.com/futurenetworks/resources/high-altitude-platform-systems-haps-whitepaper-2021/.

GSMA (2022). High Altitude Platform Systems. Towers in the Skies. Retrieved January 15, 2023, from https://www.gsma.com/futurenetworks/resources/high-altitude-platform-systems-towers-in-the-skies-version-2-0/.

Janson, S. W. (2020). A Brief History of Nanosatellites. In R. A. De Carvahlo, J. Estela, & M. Langer (Eds.), Nanosatellites. Space and Ground Technologies, Operations and Economics (pp. 1–30). Wiley & Sons Ltd.

Kinjo, H. (2016). Evolution of microsatellites and high altitude pseudo - satellites (haps). Potential for new satellite-based services. Mitsui Global Strategic Studies Institute Monthly Report. Retrieved January 12, 2023, from https://www.mitsui.com/mgssi/en/report/detail/1221520_10744.html.

Koudelka, O. (2016). Micro/Nano/Picosatellite-Activities: Challenges towards Space Education and Utilisation. In I. Marboe (Ed.), Small Satellites. Regulatory Challenges and Chances (pp. 7 – 27). Brill / Nijhoff.

Kurt, G., Khoshkholgh, M. G., Alfattani, S., Ibrahim, A., Darwish, T. S. J., Alam, M. S., Yanikomeroglu, H., & Yongacoglu, A. (2020). A Vision and Framework for the High Altitude Platform Station (HAPS) Networks of the Future. IEEE Communications Surveys and Tutorials, 23(2), 729–779. https://doi.org/10.1109/COMST.2021.3066905.

Majumdar, A.K. (2022). Laser Communication with Constellation Satellites, UAVs, HAPs and Balloons. Fundamentals and Systems Analysis for Global Connectivity. Springer.

Mohammed Chessab Mahdi, A. (2018). Attitude Stabilization for CubeSat: Concepts and Technology. Cambridge Scholars Publishing.

Nair, K. K. (2019). Small Satellites and Sustainable Development - Solutions in International Space Law. Springer International Publishing.

Saaty, T. L. (1980). The Analytic Hierarchy Process. McGraw-Hill, New York.

Sebestyen, G., Fujikawa, S., Galassi, N., & Chuchra, A. (2018). Low Earth Orbit Satellite Design. Springer International Publishing.

Steinkogler, C. (2016). Small Satellites and Space Debris Mitigation. In I. Marboe (Ed.), Small Satellites. Regulatory Challenges and Chances (pp. 211–235). Brill / Nijhoff.

Suwijak, C., & Shouping Li. (2021). Legal Challenges to the Construction and Operation of Small Satellite Constellations. Journal of East Asia & International Law, 14(1), 131–146.

Taylor, D. (2022). Small satellite market to nearly quadruple over 7-year period: report. Military Embedded Systems. Retrieved February 12, 2023, from https://militaryembedded.com/comms/satellites/small-satellite-market-to-nearly-quadruple-over-7-year-period-report.

Widiawan, A. K., & Tafazolli, R. (2007). High Altitude Platform Station (HAPS): A review of new infrastructure development for future wireless communications. Wireless Personal Communications, 42(3), 387–404.

Yang, K., & Wu, Y. (2022). Improving international governance of space debris in the era of large constellations of small satellites and China's response. Advances in Space Research. https://doi.org/10.1016/j.asr.2022.06.061.

Zheng, H., Atia, M., & Yanikomeroglu, H. (2023). High Altitude Platform Station (HAPS)-Aided GNSS for Urban Areas. https://doi.org/10.1109/WiSEE49342.2022.9926812.

Volume XIX, Issue (1) (2023) 202-213

International May Conference on Strategic Management

JOINT APPLICATION OF BCG (GROWTH-SHARE) AND SV (STRENGTH-VARIETY) MATRICES FOR THE PRODUCT STRATEGY DEVELOPMENT

Vladimir Vertogradov[1], Svetlana Shchelokova[1*], Angelina Govorova[1,2]

[1]Lomonosov Moscow State University, Russia; [2]Pirogov Russian National Research Medical University Institution, Russia

Abstract: More than half a century has passed since the appearance of the BCG matrix, and therefore it requires adaptation to current conditions. This article, considering several methodological and practical limitations of the BCG matrix, proposes a refinement and expansion of this tool. To develop effective strategic solutions, it is not always enough to understand the company's position in the market, as suggested by the BCG matrix, it is also very important to understand the competitive situation in the market, as well as the "balance of power" between the main players who will determine the (im)possibility of implementing certain strategic decisions. In order to analyse the competitive situation, it is proposed to use the SV matrix, developed to analyse the competition level in markets where there are dominant groups of companies determine the rules for all market participants. This article proposes an algorithm for the joint application of BCG and SV matrices and refines strategies for BCG matrix products (question marks, stars, cash-cows, dogs), depending on the competition level in the market under consideration, according to the SV matrix.

Keywords: economic dominance, BCG matrix, SV matrix (strength – variety)

1. INTRODUCTION

The BCG matrix was proposed more than 50 years ago and is perhaps the most popular product portfolio analysis tool. This is both caused by the apparent simplicity of the matrix use and by ready-made strategy options depending on whether the product falls into one or another quadrant. Not all the business hypotheses, laid down by the authors in the methodology of its application, correspond in the XXI century to the state of the market to which the matrices are applied. Therefore, the conclusions obtained do not always look adequate from the modern researcher's point of view, which will be discussed in detail later.

Also, in modern conditions, the calculation of points for the BCG matrix construction does not always look like an easy task. For example, for an average-sized audit company in Russia, which exists in a market where the first four companies controlled 83% of the market by the end of 2021, although there are more than 3,600 players in total (Vertogradov & Shchelokova, 2022), it will be a very difficult task to build a position on the BCG matrix relative to the leader of this market horizontally. In terms of market share, such a company will be closer to zero, and the strategies recommended by the matrix do not leave a chance for success.

[*] *Corresponding author: shcholokova@gmail.com*

The purpose of this article is to consider what are the additional opportunities that the joint use of BCG and SV matrices provides for solving strategic tasks in modern organizations.

2. WHAT IS THE BCG (GROWTH–SHARE) MATRIX?

This matrix was proposed in 1970 (Henderson, 1970) by the Boston Consulting Group (BCG), and it is one of the most well-known tools used to analyse the product portfolio and the life cycle of products for marketing and strategic management tasks. In the author's version on the BCG website (www.bcg.com):

- the market share of the product/company relative to the leader is on a horizontal scale;
- the growth rate of sales of the analysed product in the market relative to the average market growth rate of the market is on a vertical scale.

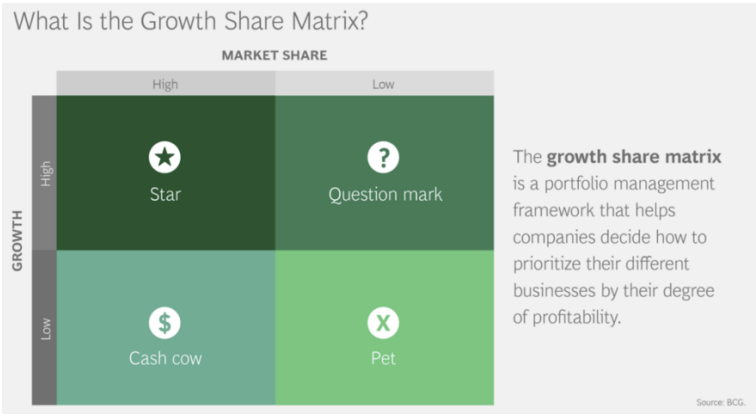


Figure 1. Description of the BCG matrix (*www.bcg.com*)

Accordingly, the resulting visualization divides the graph into 4 quadrants:

- "Star" – high market share and high growth rates. This segment brings a lot of money but requires a high volume of investments to support growth. When the market stops growing and requires money to maintain market share, products will move into the "cash cows" quadrant.
- "Cash cows" have a large market share, do not require investments and are a "cache source" for other products.
- "Pets" (or sometimes "dogs") – low market share and low growth rates. The product does not require investment but also does not bring significant income.
- "Question Marks" – low market share, but high growth rates. By default, "question marks" require more financial investments than they bring. If investments are stopped, they will most likely die. But with additional resources and with the growth of the market share they will become "Stars" or "Pets" (if the market share cannot be increased).

2.1. Disadvantages and limitations of the BCG matrix

Easy decision-making based on the BCG matrix have always attracted practitioners, but it is very important to understand the scope of the matrix and its limitations:

1. Perhaps in 1970, the market share of the product and the growth rate of its market, according to the authors of the BCG matrix, were key factors for investment choosing,

now it may not be so. For example, a company may refuse to increase market share in favor of increasing recurring revenue. For example, this is typical for the software market, when companies refused (by setting a discriminatory price) to sell software licenses, motivating the client to buy software using a subscription model with regular payments. For companies, abandoning current revenue (and, accordingly, market share) in favor of the possibility of obtaining long-term income was more profitable, since it significantly increased the valuation of companies by investors (Duò, 2022).

2. The BCG matrix authors' assumption that the market leader has a lower production cost and a higher profit margin also requires verification in modern conditions for a specific market (Whitehead, 2014). Now not all companies seek to cripple market share, especially in times of crisis, since it is quite possible that it is more profitable to work with a small part of the most marginal customers. For example, in the express delivery market, some of the leading companies do not occupy leading positions in niche market segments, as they do not see the economic sense to fight for them (Vertogradov, 2022). In some markets, the situation of copying the leader's products is significant, sometimes up to counterfeit production. It may be rather cheaper to repeat a successful product than to develop a new one, so the costs of such companies may be significantly lower, and the profit margin is at least comparable (Galazova, 2009). For example, in Russia, by the end of 2018, the volume of the counterfeit market of luxury fashion brands in retail amounted to 280 billion rubles and exceeded the volume of the legal market by 13% (Kostyrev & Shchurenkov, 2019).
3. The BCG matrix logic assumes that markets with a low growth rate are not interesting for investment, which has many counterexamples, especially for high-margin markets, where entry barriers for new players are possible. As an example, we can cite the markets of church candles or coffee shops in business centers: stable demand volume, high marginality, and high barriers to entry.
4. The model recommends the rejection of "Pets", but this group of products can serve as the basis for sales of high-margin additional products of the company. For example, if we consider separately such products as "Yandex. Navigator" and its free competitors, then they are unprofitable for the creators, but based on such unprofitable products, companies have access to a wide customer base and sell advertising and other services.
5. The matrix is very sensitive to the quality of data, even in modern conditions of the spread of accounting systems in enterprises, which can be a source of information about the growth rates of products' sales needed to determine the position of the product along the vertical axis.
6. One of the features of BCG-matrix is its retrospectivity: strategic decisions about the future are proposed to be made based on past data, which means that the proposed strategies do not consider even very obvious potential industry events.

2.2. BCG matrix modification tools

In Khismatullina & Egorova (2020), the BCG matrix is used in conjunction with Spearman's rank correlation coefficient, ABC analysis, and Dibb-Simkin analysis methods to form an optimal assortment policy for the enterprise. First, the corresponding ranks for each product are identified by the method of rank analysis through the share of output in total volume and profitability. The authors assume that greater product profitability provides a higher product share in the total output. ABC analysis, as well as BCG and Dibba-Simkin matrices, are used in classical versions, and their complex application allows you to look at the tasks of assortment planning from different managerial angles.

The joint application method of ABC analysis and BCG matrix for the meat processing plant products analysis is proposed in (Baranova, 2018). The author suggests combining the three categories of ABC analysis and the four quadrants of the BCG matrix, obtaining a 3×4 matrix, indicating recommendations for solutions for each assortment item at the intersection of the corresponding rows and columns.

In Volkov (2018), it is proposed to use the so-called "public sector portfolio matrix" to assess the effectiveness of Russia's budget policy. It is a combination of two strategic planning tools – the BCG matrix and the Ashridge matrix (the relationship between the company's management potential and the key competitive advantages of the business unit (Alexander et al., 1994).

According to Verhoef et al. (2019) the current trend of economics digitalization requires the refinement of classical management concepts, and it seems possible to expand the BCG matrix boundaries application for modern companies through its integration with one of the youngest tools in management – the SV matrix.

3. WHAT IS THE SV MATRIX (STRENGTH-VARIETY)?

The SV matrix (Strength-Variety matrix, market power/leaders differentiation) was initially developed as a solution to the problem of separating "alpha companies" by numerical methods within the theory of economic dominance framework, but gradually became an independent tool for analyzing the competition level in markets where there are dominant groups of companies determine the rules for all market participants.

Within the theory of economic dominance framework (hereinafter – TED) all companies in a certain market are divided into alphas, betas, and gammas (Blokhin et al., 2019). Alphas are usually the largest companies on the market, having access to the least expensive resources and administrative levers, but also bearing the highest costs for the development of products and the market as a whole, building the game rules, investing in innovation, etc. Unlike the prerequisites of the BCG matrix, TED does not assume that alpha companies receive a large profit margin. Alfa companies can have lower production costs, but at the same time, they invest in the development of the market in the interests of all its participants. TED is actively used to analyze modern industry and product markets (Manchenko, 2020; Blokhin & Likhachev, 2021; Govorova, 2023).

The SV matrix is used for the market, where it is possible to single out the dominant group of companies based on the Linda index (Linda, 1976) (it is also called the "core of the market"), and further evaluates two indicators that are numerically postponed on the horizontal and vertical axes:

- CRSV – total market share of the dominant group of companies in the market,
- HTSV – the level of differentiation of companies by market share within the dominant group.

Due to several methodological limitations of calculating the Linda index, it is also recommended to additionally use the Herfindahl-Hirschman index (HHI) as an important tool for verifying the level of market concentration (HHI less than 1000 shows a weak market concentration, and more than 2000-2500 – a high concentration (Bukvić et al., 2014). This methodology is presented in more detail in Shchelokova & Vertogradov (2021) and at www.svmatrix.online.

Further, depending on the CRSV and HTSV values obtained, each market will fall into one of the four quadrants, see the following table.

Table 1. Description of the quadrants of the SV matrix (Vertogradov et al., 2022)

	30% <CRSV <65% **Low market share** of the dominant group	CRSV>65% **High market share** of the dominant group
HTSV>0,1 **high level of differentiation** within the dominant group	**Quadrant I – "low or natural barriers"** There is one clear leader within the dominant group, but new players are constantly coming to the market, since it is impossible to establish barriers to their entry	**Quadrant G – "Dominant superalpha"** There is one clear leader within the dominant group that determines the rules of the game in this market
HTSV<0,1 **low level of differentiation** within the dominant group	**Quadrant RO – "Red Ocean"** Companies from the dominant group actively compete both with each other and with all other companies in the market.	**Quadrant B4 – "Natural oligopoly"** The dominant group includes several companies of comparable capabilities that are interested in preventing new players from entering their circle

There is an example of the graphical construction of the matrix below (Figure 2), that also allows visual representation of additional information about the market: for example, the size of the ball, depending on the objectives of the study, can mean both the dominant group size and the relative volume of the corresponding segment. And in the case when they study the change in the state of the market at time intervals, the arrows sequentially connect the values so that the dynamics of changes are visible.

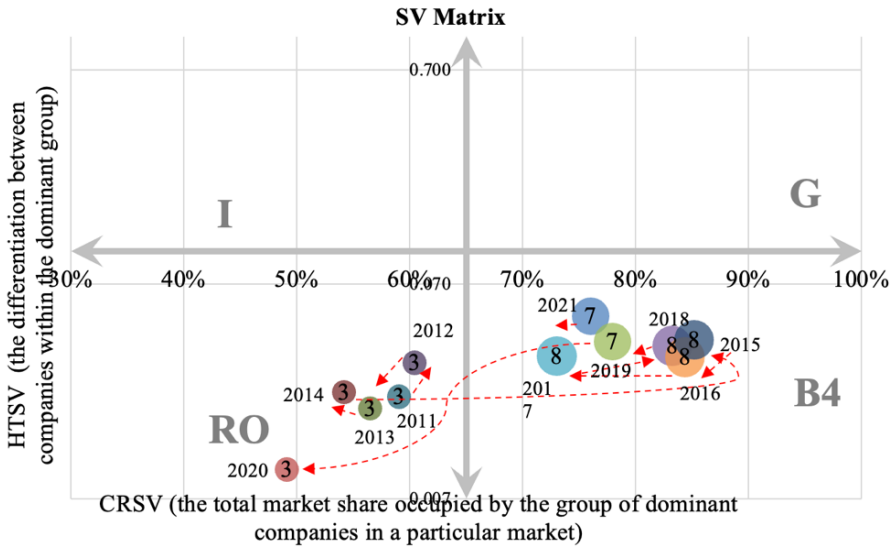


Figure 2. Example of the SV Matrix (Spektor, 2022)

3.1. Features and recommendations for the SV matrix construction

A significant advantage of using the SV matrix is that there is no need for a researcher to have access to the information about the market shares of all its participants. The Linda index can be used to calculate both absolute and relative market shares to identify dominant groups, so it is enough to have information, for example, about the revenue of the first 20 companies.

The second advantage that not only revenue can be the criteria for the dominant group. For example, if the economic feasibility of the task allows, the volume of production in money, pieces, tons, or others can be taken as analogs of revenue.

Another SV matrix advantage is its dynamism and the ability to demonstrate values for different periods on the same matrix.

3.2. Disadvantages and limitations of the SV matrix

Like any tool, the SV matrix has application limitations:

1. The SV matrix does not apply to markets where it is impossible to single out a dominant group. According to the recent studies results, in most of the studied Russian and international markets, the dominant group exists.
2. Cases, where there is only one dominant company in the market, are not identified by the Linda index. Therefore, it is recommended to additionally use the Herfindahl-Hirschman index, which always identifies such situations. But its correct application requires information about the size of the entire market and the shares of each company.
3. Currently, there is a discussion about the methodological correctness of considering a group of 10 or more companies as the dominant group (in most cases, such a large group will fall into the B4 quadrant (natural oligopoly)). Due to the peculiarities of the calculation of indices, such groups may include, for example, five large companies and seven with shares of 2-3%. Probably, such cases should be analyzed expertly, making decisions based on knowledge about a particular market, and to what extent this large group of companies has a consolidated influence on other companies in the market.

Like any analytical tool, the SV matrix is sensitive to data quality, but for many markets data is available for free, however for niche markets, it is usually available for a fee.

The SV matrix has already been widely used in the articles of its authors and by other researchers to analyze various national and international markets (insurance, automotive market, online education, international higher education market, business process outsourcing, audit services, fertilizer market, etc.) A detailed and constantly updated list of studies is provided on the website https://svmatrix.online/ru/Publications/.

4. IN WHAT CASES IS IT POSSIBLE TO USE THE SV AND BCG MATRICES TOGETHER?

The SV matrix can assess the presence of the dominant group, its composition, and the degree of companies' differentiation within the group. The BCG matrix is designed to analyze the company's product portfolio. Let's consider how the joint use of these tools can help companies to improve the adequacy and effectiveness of their strategic decisions.

4.1. The SV matrix will allow you to select a market for the BCG matrix analysis.

For companies in the dominant group in a particular market, it makes sense to apply the BCG matrix, comparing their product with the leader. For companies outside the market core, it is worth looking at a narrower market segment. For example, the same company may be an inconspicuous player in the home appliance market, not be part of the dominant group in the washing machine market, but be one of the leaders in the market of professional machines for kindergartens. In this case, the company should analyze the product position with the BCG matrix and make further investment decisions and monitor their effectiveness in the market of professional machines for kindergartens.

The combined use of the SV and BCG matrices allows numerical methods to select those markets where the company should compete and develop the most effective strategies in the selected segments. For this, it is necessary to:

1) Analyze the market using the SV matrix and determine the nature of the competition. If the company is not within the dominant group, it should consider the possibility of identifying narrower markets (for example, by product, geographical or other criteria) to determine the competitive environment and the level of competition within the dominant group more accurately.
2) For market segments where the company is in the dominant group, it makes sense to build a BCG matrix for the relevant products, and it is crucial to consider the company's position within the dominant group to make strategic decisions.

5. DIRECTIONS FOR CLARIFYING STRATEGIC DECISIONS BASED ON THE JOINT APPLICATION OF BCG AND SV MATRICES

Depending on the results of using the BCG matrix for the market segments selected using the SV matrix, various options for determining the company's development strategy are possible (see Table 2).

Table 2. SV/BCG matrix

	Stars (market leader + high growth rates)	**Cash cows** (market leader + low growth rates)	**Question marks** (not a market leader + high growth rates)	**Pets** (not a market leader + low growth rates)
G "Dominant superalpha"	• Holding the breakaway • Maintaining positions in the dominant group and the market	• Market retention by substitute goods	• Increasing market share throught new niches	• Diversification of resources into other markets • Leaving the market (including the sale of the company to interested players of the dominant group)
I "Low or natural barriers»	• Fight for new customers	• Barriers for new players, including through their inclusion in the company's own logistics chains	• Increasing market share through new niches	
RO "Red Ocean"	• Significant investments to maintain the position (by increasing sales and market share)	• Cooperation and moving to the quadrant B4 • Product development in other markets	• Race for the leader and market transfer to quadrant B4 • Significant investments	
B4 "Natural oligopoly"	• The opportunity to go to quadrant G due to high growth rates • Creating barriers for non-dominant companies	• Strengthening the barriers of the dominant group (cooperation with other group players)	• Cooperation with the leader or other players of the dominant group • Niche strategies	

5.1. "Star" strategies in the SV matrix quadrants

If a company has a "star" product, it's likely to be a market/segment leader (since these products are not within this quadrant of the BCG matrix in another situation), and the company's sales are growing faster than the average market. Let's consider four options for the location of the "star" in the SV matrix:

1) G – the company is the dominant player in this market and the leader of the dominant group. The task of such a company is to keep the existing gap from other players. An additional task is to invest in maintaining and strengthening institutional advantages that guarantee leadership and to prevent the situation of strengthening competitors who can win new consumers in a growing market or win market share from existing players. In 2018, SOGAZ Insurance Group broke away from its competitors by acquiring the second-largest player in the personal insurance market – all VTB Insurance Group companies. As a result, the leader's share increased from 23.4% to 42.2% (Shchelokova & Vertogradov, 2023).
2) B4 is a leading company with an insignificant gap from its main competitors (there is a "natural oligopoly" in the market). If a company grows faster than others in the dominant group, then it can move the market to the G quadrant, at least by increasing the gap from other players. If there is no such possibility because all players in the dominant group are growing faster than the market (probably due to acquisitions of shares of companies outside the dominant group), then, at least, it is necessary to protect this "natural oligopoly" by creating barriers for other players who are not part of the dominant group.
3) RO – despite its not very significant position in the market, formally the company is the leader of a poorly differentiated dominant group. To maintain its leading position, it will need a large amount of investment, which corresponds to the canonical recommendations of the BCG matrix for "stars": to invest in sales growth and market share. Investments in this case allow you to maintain a leading position even in times of crisis. In 2020 the economic activity in Brazil significantly decreased due to the coronavirus: the reasons were both a drop in household incomes and many deaths from COVID-19. Three foreign brands managed to maintain their positions in the automotive market: Volkswagen, Chevrolet, and Fiat, which had enough resources (both financial and production) to retain their market shares (Spektor, 2022).
4) It is a leading company (with a large margin from other companies of the dominant group), but there is a large number of potential competitors that can weaken the company's position since the barriers to entry into the market are relatively low. In this case, the main recommendations for this type of product are the struggle for new customers, and the search for new segments in a growing market to maintain and strengthen their positions (ideally, move to segment G). For example, according to (Korostyleva, Suslova, & Spektor, 2022), segment I is characteristic of the international education market, with the USA being the leader in most cases. Traditional strategies for a competitor are the development through leadership in educational innovations and the creation of the most attractive employment conditions for scientists and applicants from all over the world largely comply with the recommendations above.

5.2. "Cash cow" strategic options

Cash cow companies occupy a leading position, but their sales growth rates are below the market average. This situation is different from the previous one ("star"), since the growth rate is much slower, it is more difficult for the company to maintain a dominant position. Depending on the nature of dominance in the market under consideration, the following strategic options can be considered for "cash cow" products:

1. G – keeping the market from disintegration and competition with substitute goods (alternative products that can cover the needs of current customers). During the crisis caused by the 2020 pandemic, Danone's share was declining in many segments of the Russian food market. It was possible to maintain a leading position due to the expansion of the business into vegan or vegetarian dairy products (Yakimova, 2023).

2. B4 – put efforts with other companies strengthening barriers around the dominant group to increase the distance from other players. In most of the Russian markets analysed by various authors using the SV matrix, the dominant group in the B4 quadrant consisted mainly of foreign companies. After the withdrawal of most foreign companies from the Russian market in 2022, a significant change in its structure is expected. In this regard, it will be important to analyze the behavior of the former "cash cows" of these markets – Russian companies whose growth rates were relatively low due to institutional barriers built by the dominant group.
3. RO is a high-margin "cow", so it is important to assess whether it makes sense to invest additional efforts to protect the company's position in a situation where competition is quite tough (demand is limited, players do not have strong advantages), it may be worth trying to unite with other players and move the market to the B4 quadrant, or focus on the development of new products in more promising markets.
4. I – in such a situation, it is important for a company to "defend" its "pasture" from new competitors, since the barriers to entry into the market are low. The classic representative of the I quadrant is Ikea. Having shown low growth rates by the end of 2020 (IKEA sales in Russia show positive dynamics, 2020) against the background of the overall growth rate of furniture production in Russia, but with a well-established system of sales, procurement, and quality control of products, Ikea dominated the sale of furniture and most of its direct competitors in the industry supply their products to it. It is impossible for large furniture market manufacturers not to work with such a powerful company as Ikea. But starting to work with it, companies also lose opportunities for their own development, as Ikea dictates its conditions, becoming a key customer (Laguntsov, 2022).

5.3. "Question mark" strategic options

The "question mark" companies do not occupy a leading position in terms of market share, but their product sales growth rate are higher than the market average. On the one hand, there are larger players by market share, whose position cannot be ignored, on the other hand, such firms have growth potential.

1. G and I – the market leaders are likely to have significant institutional advantages, so it will be difficult to fight him. A possible strategy, in this case, would be to increase market share by winning consumers in niche segments (which are often not interesting to the dominant player). For example, before the pandemic in Russia, the Aeroflot group controlled 46.8% of the total passenger turnover in Russia. Its closest competitors S7 (14% of passenger turnover) and AzurAir (10%) have chosen to compete through niches. With the dominance of Aeroflot on international scheduled flights: S7 strengthened its position in the domestic market, and AzurAir specializes in charter flights (Volohov, 2020).
2. B4 – one of the strategic options can be to unite with the leader and other members of the market core to separate and differentiate from other players. Such companies need to become leaders in market niches where they have institutional or market advantages. In this case, it is very important to make efforts to prevent an increase in separation from larger players, as this may lead to falling out of the dominant group and depriving all the institutional advantages associated with this group. For example, according to the experience of allocating state subsidies to support the Russian automotive industry, leading companies in the mass automotive market always receive them, because they meet the current requirements for localization of production. The loss of one of the producers from such a group of "subsidized leaders" will greatly weaken the price competitiveness of its products.

3. RO – on the one hand, it may make sense to catch up with the leader and move the market to B4, but a high level of competition determines a high need for investment to maintain and increase market share. In this case, it is important to evaluate the advantages of the company relative to competitors to determine the prospects of the applied efforts. For example, in 2004, Microsoft Explorer dominated desktop browsers with a market share of 94.5%. In 2014, it was overtaken by Google's Chrome browser, which took 68.76% by the end of 2021, and the share of Microsoft's browser fell to 1.6% (Web browser market share in 2021, 2021). Google had enough resources and perseverance to defeat the leader, which cannot be said about other market participants – Opera, Firefox, and the rest.

5.4. "Question mark" strategic options

A product with a low market share and sales rates is unlikely to be in the dominant group. And the BCG matrix suggests giving up such products, although in real life such a refusal is not always a good decision.

Indeed, due to the final stage of the product life cycle in this quadrant, it makes no sense to invest significant resources in the development of the product (an exception may be the case when it is potentially possible to resume the development of this market).

The classic strategies of the BCG matrix offer in this quadrant cardinal reduction strategies such as closing or selling a business. Is it always worth giving up the "pet" product? The answer to this question will depend on the financial attractiveness of this product (yes, it may not be high-margin, but, for example, due to a high share in the company's portfolio, it will bear most of the fixed costs, thereby "increasing" the marginality of other products), as well as on the role of this product in the business model (for example, when this product provides access to the customer base or other sources of income of the company).

The possibility of selling this business will differ by the segments of the SV matrix. In several situations discussed above, participants in markets I and B4 are invited to increase the gap from other players in order to transfer the market segment in question to the G quadrant: the presence of players interested in such a transition will affect the attractiveness and the possibility of selling this business.

6. KEY CONCLUSIONS AND RECOMMENDATIONS ON THE USE OF STRENGTH–VARIETY AND GROWTH–SHARE MATRICES

1. The BCG matrix is very limited in use nowadays, since there is rarely a situation when the prerequisites laid down in the matrix are fulfilled. This causes a large amount of criticism, as well as many authors' interpretations to improve the results of using the tool. If the tool is used carelessly, the conclusions obtained will not reflect reality, and the recommended strategies will be incorrect. The joint application of the BCG matrix with the SV matrix will help to select the market more accurately for the application of the BCG matrix, as well as adjust the recommended strategies considering the nature of competition in the market under consideration.
2. This study proposes an algorithm for the joint application of the SV and BCG matrices for current markets: before applying the BCG matrix, it is necessary to assess the level of competition in the market under consideration, as well as the strength of the dominant players (using the SV matrix). It is also important to pay attention to the correct definition of the "market" for a company's product. Understanding which quadrant of the SV matrix your product falls into (according to the BCG matrix) will help develop more informed strategies.

3. In different competitive markets for the same types of products (pet, star, etc.) effective strategies for the development of these products will differ. For example, for "question mark" products in the RO, G, and B4 quadrants will differ significantly, as for other types of products.

We recommend using these tools together, because when analyzing modern markets, following the basic strategies of the BCG matrix does not always lead to the desired result, and using it together with the SV matrix will significantly enhance the quality of conclusions based on the analysis results.

REFERENCES

Alexander, M., Campbell, A., & Goo, M. (1994). Corporate-Level Strategy: Creating Value in the Multibusiness Company. John Wiley.

Baranova , L. S. (2018). Industrial enterprise sales management: methods and tools. Peterburgskij ekonomicheskij zhurnal, 3, 142-152.

Blokhin , A. A., Lomakin-Rumyantsev, I. V., & Naumov, S. A. (2019). Alpha Business in the Russian Food Market. (in Russian). Economic Strategies, 6, 68-77.

Blokhin, A. A., & Likhachev, A. A. (2021). Institutional Barriers for Fast Growing Companies. Forcasting Problems, 39-47.

Boston Consulting Group website. Retrieved from: https://www.bcg.com/about/overview/our-history/growth-share-matrix (accessed 14.03.2023).

Bukvić, R., Pavlović, R., & Gajić, I. (2014). Possibilities of Application of the Index Concentration of Linda in Small Economy: Example of Serbian Food Industries. Annals of the Oradea University. Fascicle of Management and Technological Engineering, 23 (13), 159-164.

Galazova, T. E. (2009). Theoretical characteristics of the counterfeit goods market. (in Russian). Terra Economicus, 7(3-2), 7-9.

Govorova, A. V. (2023). History and Paradoxes of the Chinese Car Market: Eastern Strategies and the Asian Regulator. Studies on Russian Economic Development, 34(1), 150-158.

Duò M. (2022). Why Your Business Should Be Based on the Recurring Revenue Model. Retrieved from: https://kinsta.com/blog/recurring-revenue-model/ (accessed 09.04.2023)

Henderson, B. D. (1970). The Product Portfolio. Perspectives. Retrieved from https://web-assets.bcg.com/img-src/BCG_The_Product_Portfolio_tcm9-139921.pdf

IKEA sales in Russia show positive dynamics. (2020). (in Russian). Retrieved from: https://new-retail.ru/novosti/retail/prodazhi_ikea_v_rossii_pokazyvayut_polozhitelnuyu_dinamiku3266/ (accessed 09.04.2023).

Khismatullina, A. M., & Egorova, A. A. (2020). Methods for evaluating the effectiveness of managing the producct portfolio of PJSC "Nizhnekamskneftekhim". Journal of Economy and Business, 9(2), 129-135.

Korostyleva, I., Suslova, I., & Spektor, S. (2022). Dominance of National Systems of Higher Education. Ekonomicheskie strategii, 3 (83), 148-163.

Kostyrev, A., Shchurenkov N. (2019). Counterfeit is a stubborn thing. (in Russian). Kommersant. Retrieved from: https://www.kommersant.ru/doc/4024846 (accessed 09.04.2023)

Laguntsov, I. N. (2022). How to dominate the local furniture market without own production. Microeconomics, 1, 55-65.

Linda, R. (1976). Methodology of concentration analysis applied to the study of industries and Markets. Brussels: Commission of the European Communities.

Manchenko, M. I. (2020). Express Delivery Market through the Prism of Economic Dominance. Logistics, 5, 9-15.

Shchelokova, S. V., & Vertogradov, V. A. (2021). SV matrix: strategic competitive analysis tool based on the dominance level. Moscow University Economics Bulletin.Series 6. Economics, 6, 137-142.

Shchelokova, S. V., & Vertogradov, V. A. (2023). Individual insurance products: is there a real choice for Russians? Population and Economics, 7(1), 1-20.

Spektor, S. V. (2022). Competition in the Brazilian Automotive Market in 2011-2021. Latinskaya Amerika, 7, 21-34.

Verhoef, P. C., Broekhuizen, T., Bart ,Y., Bhattacharya, A., Dong, J., Fabian, N., & Haenlein, N. (2019). Digital transformation: A multidisciplinary reflection and research agenda. Journal of Business Research, 122, 889-901.

Vertogradov, V. A. (2022). The Possibility of Identifying Alpha-Companies by Statistical Methods on the Example of the Express-Logistics Market In Russia. The World of the New Economy, 16(1), 73-80.

Vertogradov, V. A., & Shchelokova, S. V. (2022). Premium Car Brands Strategies and Regulator's Actions in Russia (2009–2021). The world of new economy, 16(2), 64-75.

Vertogradov, V. A., Shchelokova, S. V., & Spektor, S. V. (2022). Competition and Dominance in the Russian Insurance Market. Strahovoe delo [Insurance Business], (4), 9-21.

Volkov, I. I. (2018). The Approach of Portfolio Matrix to Assess Efficiency of Budget Policy Of Russia. Bulletin of Plekhanov Russian University of Economics, 101 (5), 37-46.

Volohov, A. V. (2020). Research of competitive positions and financial stability of PAO «Aeroflot». Kreativnaya ekonomika, 14(8), 1829–1846.

Web browser market share in 2021: more than 85 browser usage statistics. 2021. (in Russian). Retrieved from: https://www.affde.com/ru/browser-market-share.html (accessed 09.04.2023)

Whitehead, J. (2014). BCG (Growth Share) Matrix // Wiley Encyclopedia of Management.

Yakimova, E. A. (2023). Healthy Food Products: Competition of Manufacturers in the Russian Market. Scientific Research of Faculty of Economics. Electronic Journal, 15(1), 71-108.

Volume XIX, Issue (1) (2023) 214-225

International May Conference on Strategic Management

RELATIONSHIP BETWEEN JOB DESIGN AND ORGANIZATIONAL CITIZENSHIP BEHAVIOUR – THE MEDIATING ROLE OF EMPLOYEE ENGAGEMENT

Thiruchelvi Arunachalam[1*], Mukil Kumar Yogesh[2]

[1]Department of Management Studies, CEG Campus, Anna University, Chennai, Tamilnadu;
[2]Department of Computing Technology, SRM Institute of Science and Technology, KTR Campus, Tamilnadu, India

Abstract: It is essential to make sure that the employees remain engaged and ensure discretionary efforts. This study determines how job characteristics affect the engagement and organizational citizenship behaviour. This study explores the role of job characteristics in determining engagement and organizational citizenship behaviour in the Indian scenario, and especially in the IT sector. Data was collected from employees working in the IT industry in India using a questionnaire designed for the purpose of the study. The results revealed that employee engagement fully mediated the relationship between skill variety, task identity and organizational citizenship behaviour and partially mediated the relationship between task significance and organizational citizenship behaviour. Job design based interventions are discussed to improve employee engagement and to motivate employees to exert discretionary behaviour in organizations.

Keywords: Employee Engagement, Job Design, Organizational Citizenship Behaviour, IT Sector

1. INTRODUCTION

Employee engagement has become an important topic for research because of the expectation that engaged employees perform better and contribute to higher levels of organizational performance. Hence, there is a pressing need for creating and leveraging highly engaged employees. The challenge for businesses is to create an environment where employees understand and commit to the company's direction, strategy and goals. This requires a holistic, coordinated effort to ensure that a number of key elements or building blocks are in place to promote alignment. Employee engagement is, arguably, the most critical metric for organizations in the twenty first century. Apart from this, to be successful in today's competitive environment, employees' extra role behaviour will help organizations to accelerate towards innovation and productive approaches. Organ (1990) emphasized, organizational citizenship behaviour leads to effective organizations and bring new resources for them

When people positively evaluate their experience of the job and organization, they are more likely to feel satisfied, committed and proud, and act as advocates for the company and engage in behaviours that enhance both job and organizational performance. Hence, it is

[*] *Corresponding author: thiruchelvi.y@gmail.com*

imperative that employees should feel engaged to both job and organization to exert discretionary behaviour whole heartedly in the organization, thereby contributing to the growth of the organization. People also vary in their engagement as a function of their perceptions of the benefits they receive from a job. Engagement is being shaped by the job dimensions, namely significance of the job done, the extent to which the employee identifies with the given job and the importance of jobs in the organization. Hence, this study aims to test the impact of job dimensions on employee engagement and organizational citizenship behaviour.

Though there are attempts to find the impact of JCM on organizational outcomes, there is still a paucity of work to identify the process by which job design impacts organizational outcomes (Shantz et al., 2013). Shantz et al., (2013) have found that not all job characteristics could impact organizational outcomes, which deferred from the findings of previous research (Fried & Ferris, 1987; Campion et al., 2005). Though Humphrey et al. (2007) found a mixed result in their meta- analytic study, results of Shantz et al. (2013) deferred from this also. The reason might be the nature of work / task, which has never been accounted for in any of these studies. Hence, a study with a different work set up is always warranted to consolidate the results as work contexts create conditions in which individuals can personally engage with their work (Kahn, 1990). Hence, the importance of work context is important in establishing the relationship between JCM and OCB. If research could find the importance of work context, a new model could be established highlighting the role of work context in JCM. Further, there are limited number of studies testing the mediating role of employee engagement in the relationship between JCM and extra role behaviour (Shantz et al., 2013). The purpose of the study is to explore the mediating role of employee engagement in the relationship between JCM and OCB.

This study extends the prior work in many ways. Many studies have attempted job design as a combined single measure (Kumar et al., 2021) and only a handful of studies have consolidated the five factors separately (Salanova & Schaufeli 2008, Shantz et al., 2013). Majority of the studies have used one or few job characteristics (Salanova & Schaufeli, 2008), hardly few attempts have been made considering all five job characteristics (Shantz et al., 2013). This study has treated the five components of JCM separately.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Organ (1988) defined organizational citizenship behaviour as a representative of individual behaviour that is discretionary, not directly or explicitly recognized by the formal system. OCB includes extra role behaviours such as co-operation with workers, coming at workplace earlier and leaving late if required, helping others, using organizational resources with care, spreading positivity in organization (Turnispeed & Rassuli, 2005). Organizational citizenship can help organizations to improve performance and gain competitive edge as it motivates employees to perform beyond the formal job requirement.

Employee Engagement is defined as the emotional and intellectual commitment to the organization (Richman, 2006), or the individual's involvement, satisfaction and enthusiasm for work (Harter et al., 2002). Employee engagement results in a fulfilling, positive work-related experience and state of mind (Sonnentag, 2003; Schaufeli & Bakker, 2004), which leads positive work outcomes (Sonnentag, 2003). Research by Schaufeli and Bakker (2004) has proved that engaged employees are more likely to have a greater attachment to their organization, which results in a more trusting and loyal relationship and mutual commitments (Cropanzano & Mitchell, 2005). Hence, employees who are more engaged are likely to be in more trusting and high-quality relationships with their employer and will, therefore, be more likely to report more positive attitudes and intentions toward the organization, which in turn

make the employees to exert more discretionary positive work behaviours towards the organization. Employee engagement has been found to be positively related to extra-role behaviour and organizational citizenship behaviour (Sugianingrat et al., 2019; Al Ahad & Khan, 2020). Hence, it is hypothesized as employee engagement positively impacts organizational citizenship behaviour.

H1: Employee Engagement is positively related to Organizational Citizenship Behavior.

Most research on job design stems from Hackman and Oldman's (1975, 1976) Job Characteristics Model (JCM), which identifies five core job features as motivational properties of a job: task variety/skill variety, task identity, task significance, autonomy and feedback. Employees who perceived their jobs as meaningful, involving a variety of activities, and representing an entire function (rather than pieces of a larger job), were more likely to have higher performance ratings than employees who perceived their jobs to be low on these characteristics. This is because job characteristics can impact employee motivation, a necessary ingredient for engagement and performance. According to Holbeche and Springett (2003), people's perceptions of 'meaning' with regard to the workplace are clearly linked to their levels of engagement and, ultimately, their performance. They argue that employees actively seek meaning through their work and, unless organisations try to provide a sense of meaning, employees are likely to quit. There are numerous possible reasons for this, for example, it may be because people generally spend longer at work than in other parts of their lives. Jobs that are high on the core job characteristics provide employees with opportunities to bring more of themselves into their work and to be more engaged (Kahn, 1992). Not only meta-analytic reviews have established the relationship between job design and employee engagement (Fried & Ferris, 1987; Humphrey et al., 2007; Wollard & Shuck, 2011), empirical studies have also established the role of job design in employee engagement (Saks, 2006; Shantz et al., 2013).

In many of the above-mentioned studies, the job characteristics were combined into a composite variable with other variables that are unrelated to job characteristics (e.g., leadership, social support). Few of the studies which have considered the job dimensions separately based on JCM, have not taken all the five characteristics. They have taken only two or three characteristics. Studies which had taken all the five job characteristics of JCM are very limited, which warrants this study. This study considers each of the five job characteristics separately. The present study extends the research findings in an assessment of each of the five job characteristics on engagement, contributing to an understanding of the relative strength of each job characteristic in relation to engagement. Testing the role of each of the five job characteristics independently, rather than as a composite score of them (i.e. motivating potential score), enables the development of specific, actionable recommendations for organizations. Such an analysis will reveal the relative strength of each job characteristic on determining employee engagement and OCB, so that recommendations can be specifically given for the job characteristic. Hence, it is hypothesized

H2: Job design has a positive impact on Employee engagement.

In detail, Skill Variety, Task Identity, Task Significance, Feedback and Autonomy have a positive impact on Employee Engagement.

Hackman and Oldham's (1975; 1976) Job Characteristics Model (JCM) suggests that core job characteristics lead to organizational citizenship and produces a positive impact on employee motivation. Podsakoff et al., (2000) studied more than 200 published studies in between 1983 and 1999 and came up with antecedents and consequences of OCB, where they found task characteristics as one of the major determinants of OCB. While examining a direct relationship between job characteristic and OCB it was found that task variables directly impact OCB (Farh et al., 1990; Bolino et al., 2018). Task variables such as task variety, task significance and job identity positively impact OCB (Chiu & Chen, 2005; Todd & Kent, 2006).

Krishnan et al., (2017) research found that, the relationship between job autonomy and OCB was not significant. However, the study found a significant relationship between task variables, task significance and OCB, where as Shantz et al., (2013) found that feedback, autonomy, task significance, and task variety were positively related to both engagement and OCB and task identity was not related to both engagement and OCB. As the results are mixed, this study attempts to clarify the role of job characteristics in determining OCB. Hence, it is hypothesized as

H3: Job design has a positive impact on Organizational Citizenship Behaviour.

In detail, Skill Variety, Task Identity, Task Significance, Feedback and Autonomy have a positive impact on Organizational Citizenship Behaviour.

Research has provided relationship among job design, employee engagement and OCB, hence it is hypothesized as, Employee engagement mediates the relationship between job design and OCB.

In detail,

H4: Employee Engagement mediates the effect of Skill Variety on Organization Citizenship Behaviour.

H5: Employee Engagement mediates the effect of Task Identity on Organization Citizenship Behaviour.

H6: Employee Engagement mediates the effect of Task Significance on Organization Citizenship Behaviour.

H7: Employee Engagement mediates the effect of Feedback on Organization Citizenship Behaviour.

H8: Employee Engagement mediates the effect of Autonomy on Organization Citizenship Behaviour.

2.1. The Research Model

Based on the stated hypotheses, a model was formulated and shown in figure 1.

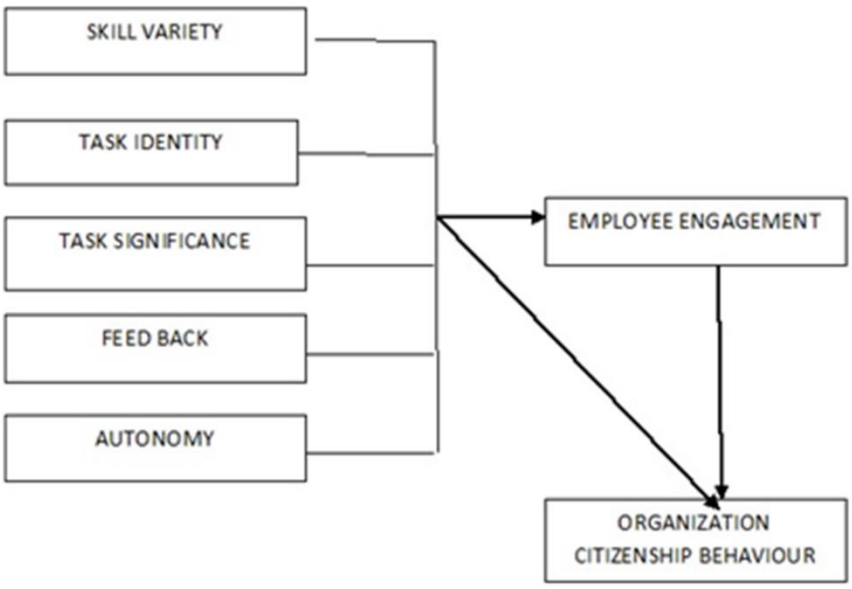


Figure 1. Hypothesized Model

3. METHODOLOGY

3.1. Participants

The data for this investigation was collected using questionnaire, from the employees of four major Software companies. The analyses in this paper were conducted on a sample of 200 employees. Men (46%) and women (54%) were nearly equal in the sample. 43% of the employees are married and 57% are single. About 80% of the employees were below the age of 30 years. Half (50%) of the employees had a work experience of below 3 years, 23% had 3 to 5 years and 27% had above 5 years of experience.

3.2. Instrument

Organizational citizenship behaviour (OCB) directed to the individual and the organization was each measured by four-items each from Lee and Allen (2002). The average of all the eight items was taken as a measure of OCB. Participants responded using a five-point Likert-type scale with anchors (1) never to (5) always. Employee engagement (EE) was measured using the Utrecht Work Engagement Scale (UWES) of Schaufeli et al., (2002). The scale consists of three subscales; absorption, vigor and dedication. All the 17 items were rated on a 5-point Likert scale (1 = strongly disagree, 5 =strongly agree). The average of the 17 items was taken as a measure of employee engagement. Task Identity (TI), Skill Variety (SV), Task Significance (TS), Feedback (FB) and Autonomy (AUT) were measured by four items for each from the Job Characteristics Questionnaire of Hackman and Oldham (1975). Participants indicated the extent or amount of each characteristic in their job using specific five-point anchors such as (1) very descriptive to (5) very non descriptive.

The data were collected using questionnaires which were distributed to the employees with clear instructions on how to fill them and the responses were collected. The purpose of the study was clearly stated along with the ethical considerations in a cover letter and a consent form was attached along with a questionnaire.

3.3. Statistical Analysis

In order to check the causal relationships between the dependent and the independent variables and to understand the strength of the relationship simple regression analysis was carried out. Multiple regression was used to assess the relationship between a dependent (predicted) variable and several independent (predictor) variables. Baron and Kenny (1986) hierarchical regressions were used to test mediation. Sobel test (1982) was used to test the amount of indirect effect and bootstrapping.

4. RESULTS

4.1. Reliability and Validity

Descriptive statistics of the study variables are presented in Table 1. The reliability of the study variables was assessed through Cronbach’s alpha, and the validity was assessed through composite ratio and average variance extracted. The details are given in table 1.

The mean score of autonomy (2.721) is the lowest among the five job characteristics considered. The Cronbach's Alpha value of all the variables considered in this study are all

above 0.7, indicating high internal consistency of the items and could be considered for further analysis (Hair et al., 1998).

Table 1. Reliability and Validity

Variable	Mean	Std. Deviation	Cronbach's Alpha	Number of Items	Composite Reliability (CR)	Average Variance Extracted (AVE)
EE	3.279	0.577	0.88	17	0.942	0.821
OCB	3.276	0.554	0.799	7	0.905	0.803
TI	3.223	0.522	0.759	4	0.871	0.701
TS	3.228	0.550	0.812	4	0.852	0.654
SV	3.195	0.542	0.758	4	0.867	0.692
FB	3.103	0.538	0.821	4	0.934	0.818
AUT	2.721	0.5142	0.843	4	0.928	0.804

TI = Task Identity; TS = Task Significance, SV = Skill Variety, FB = Feedback, AUT=Autonomy

Cronbach's alpha sometimes may under estimate or over-estimate the reliability, hence composite reliability (CR) was also calculated. Composite reliability is an indicator of the shared variance among the observed variables used as an indicator of a latent construct (Fornell & Larcker, 1981). CR was found to range from 0.852 to 0.942, which was above the suggested cut off value of 0.7 (Nunnally, 1994). Average variance extracted (AVE) was also calculated to ensure reliability and validity. Convergent validity is established as the AVE was found to range between 0.654 to 0.821. If the AVE of a construct is greater than the inter- correlational value of the construct with any other study variables, then the discriminant validity of the construct is established (Fornell & Larcker, 1981). This study also reported the same, establishing discriminant validity.

4.2. Hypotheses Testing

To test the first three stated hypotheses H1, H2 and H3, regression analysis was used. As expected, employee engagement was positively related to organization citizenship behaviour ($r=0.518$, $t=14.538$, $p<0.05$). Hence, hypothesis H1 was accepted. To test H2 and H3, multiple regression analysis was used and the results are given in table 2 and 3.

Table 2. Multiple Regression: Job Design Vs Employee Engagement

Variable	Beta	t	P
TI	0.457	10.083	<0.05
TS	0.185	3.741	<0.05
SV	0.36	7.306	<0.05
AUT	0.082	0.854	>0.05
FB	0.053	0.635	>0.05
r^2	0.838		
Adjusted r^2	0.836		

Note: Dep. Variable: Employee engagement

Table 3. Multiple Regression: Job Design Vs OCB

Variable	Beta	t	P
TI	0.473	11.061	<0.05
TS	0.196	4.021	<0.05
SV	0.358	7.868	<0.05
AUT	0.052	0.554	>0.05
FB	0.033	0335	>0.05
r^2	0.843		
Adjusted r^2	0.839		

Note: Dep. Variable: OCB

In harmony with hypothesis 2, job design impact employee engagement. Looking into the beta values of the five job characteristics taken, it is clear that task identity (β=0.457, p<0.05), skill variety (β=0.360, p<0.05) and task significance (β=0.185, p<0.05) have an impact on employee engagement, whereas autonomy (β=0.082, p>0.05) and feedback (β= 0.053, p>0.05) have no role to play in developing employee engagement. Hence, it is not appropriate to conclude that job design is positively related to employee engagement. Conclusions need to be made based on the job characteristics individually.

Similarly, in harmony with hypothesis 3, job design impact OCB (r^2=0.843). The study has proved that job characteristics, task identity (0.473), skill variety (0.358) and task significance (0.196) predict OCB. The study has revealed that task identity predicts employee engagement and OCB significantly. The study has also revealed that task plays a predominant role than skills in determining employee engagement and OCB.

Task identity, skill variety and task significance predict both employee engagement and OCB, as well as employee engagement predicts OCB. Hence, there is the possibility of testing the mediating role of employee engagement in the relationship between task identity, skill variety, task significance and OCB (Hypotheses H4, H5 and H6). The study has also reported that feedback and autonomy do not impact both employee engagement and OCB. Hence, hypotheses H7 and H8 were rejected.

4.3. Mediation Analysis

For hypothesis H4, H5 and H6, mediation was tested using Baron & Kenny method. The Sobel (1982) test was used to test the significance of the indirect effect through bootstrapping. Table 4 presents the unstandardized regression coefficients, their standard errors, and p values for the variables in the model.

Table 4. Mediated Paths

Model Tested	Path a	Path b	Path c	Path c′	Indirect Effect	CI- LL	CI- UL
SV – EE –OCB	0.779 (0.3477)*	0.836 (0.3177)*	0.903 (0.2386)*	0.082 (0.057)	0.7125	0.5934	0.8356
TI – EE –OCB	0.801 (0.3323)*	0.853 (0.3015)*	0.903 (0.2386)*	0.109 (0.062)	0.7331	0.5481	0.8904
TS – EE –OCB	0.831 (0.3084)*	0.799 (0.3477)*	0.903 (0.2386)*	0.304 (0.046)*	0.5305	0.4385	0.6254

NOTE: *Standard errors are in parentheses. Unstandardized regression coefficients are reported.*
**p < 0.05.*

For Hypothesis 4, the first path from skill variety to OCB was found to be significant; the second path from skill variety to employee engagement was also significant. The third path from employee engagement to OCB was also significant and in the final path, the positive relationship between skill variety and employee engagement was reduced to be insignificant with the beta value being reduced and has become insignificant, conforming full mediation. The beta value of the indirect effect using Sobel's test was found to be 0.7125 and the confidence interval did not include zero. This shows that the indirect effect is significant at 95% confidence interval.

For Hypothesis 5, the paths from task identity to OCB, task identity to employee engagement and employee engagement to OCB were significant and in the final path, the positive relationship between task identity and employee engagement was reduced to be insignificant with the beta value being reduced to and has become insignificant, conforming full mediation. The indirect effect using Sobel's test is significant at 95% confidence interval.

For Hypothesis 6, the paths from task significance to OCB, task significance to employee engagement and employee engagement to OCB were significant. The final path, the positive relationship between task significance and employee engagement still remained significant with the beta value being reduced to and confirming only partial mediation. From the table 4, the value for the indirect effect using Sobel's test was found to be 0.5305 and the confidence interval did not include zero. This shows that the indirect effect is significant at 95% confidence interval.

Hence, it is inferred that employee engagement mediates the relationship between task identity, skill variety and task significance and OCB.

5. DISCUSSION & CONCLUSION

There has been a great deal of interest in employee engagement in recent years especially among practitioners and consultants. This study tried to capture the job-related dimensions in determining employee engagement and OCB. This study also tried to find the mediating role of employee engagement in the relationship between job characteristics and OCB. This study has found a positive relationship between employee engagement and organizational citizenship behaviour which corroborates with many other research findings (Dalal et al., 2012; Rurkkhum & Bartlett, 2012; Ariani, 2013; Alfes et al., 2013). This study has also found that job dimensions like skill variety, task identity and task significance positively impact organizational citizenship behaviour and this relationship is mediated by employee engagement. This result corroborates the results of previous studies (Saks, 2006; Krishnan et al., 2017). Maric et al., (2019) have proved that formal job resources (task variety and task significance) and job challenges (skill variety and job innovation requirement) are indirectly (via work engagement) related to employee's citizenship behaviour. This study has also reported similar results. This study has reported that feedback and autonomy does not impact employee engagement and OCB. This result differs from previous studies (Bakker & Bal,2010; Christian et al., 2011; Menguc et al., 2013; Shantz et al., 2013). The reason might be the nature of workforce chosen for the study. The study has been conducted among employees of software organizations, where the work is highly structured and hence,it might not have given more chance for exerting autonomy in the work. Feedback has been found to be positively related to employee engagement in service-oriented organizations (Menguc et al., 2013). In software organizations, feedback might have been more routinized, which might have led not to play any role in determining employee engagement and OCB. Further research on understanding the role of feedback and autonomy in employee engagement in software employees is guaranteed for future model developments.

Good job design—structuring jobs to maximize desirable characteristics—supports organizational efficiency and effectiveness. This is because job characteristics can impact employee motivation, a necessary ingredient for engagement and performance. Performing a variety of tasks that require a wide range of knowledge, skills, and abilities. Completing whole pieces of work or projects and having a significant impact through work can also help increase the levels of engagement. Managers should find out what resources and benefits are most desired by employees and most likely to create a sense of obligation that is returned with greater levels of engagement. Employees who perceive higher organizational support are more likely to reciprocate with greater levels of engagement in their job and in the organization; employees who are provided with jobs that are high on the job characteristics are more likely to reciprocate with greater job engagement.

Jobs that are high on the job characteristics like skill variety, task identity and task significance provide individuals to bring more of themselves into their work, to be more engaged and exert more discretionary efforts for organizational growth and effectiveness (Kahn, 1992). Job design interventions that provide employees with more variety in their work should be designed and implemented in organizations to have highly engaged workforce in the organizations. Managers need to provide employees with resources and benefits that will oblige them to reciprocate in kind with higher levels of engagement. The organizations need to provide challenging work, variety, allow the use of different skills, personal discretion, and the opportunity to make important contributions. The more the task variety and skill variety needed in a job, higher will be the engagement levels. Also, the study has proved that employee engagement fully mediated the relation between skill variety and OCB. Hence, organizations can design strategies to improve employee engagement, there by achieving citizenship behaviour. Task significance is seen to have a positive impact on employee engagement which in turn leads to OCB. This shows that if the job has a substantial impact on lives or work of other people, whether in the immediate organization or in the external environment then the employees will be more engaged to involve themselves in activities that would benefit the other employees and the organization and will display a favourable discretionary behaviour at work. The study has used self-reports which might have resulted in personal bias, hence further research could be attempted using multiple data sources for the same variable, for example rating by peers, supervisors could be included. Further studies can include other job characteristics, job resources and job demands.

REFERENCES

Al Ahad, A. & Khan, M. R. (2020). Exploring the mediating effect of demographic attributes on the relationship between employee engagement and organizational citizenship behavior. International Journal of Management and Sustainability, 9(1), 11-23.

Ariani, D. W. (2013). The relationship between employee engagement, organizational citizenship behavior, and counterproductive work behavior. International Journal of Business Administration, 4(2), 46-56.

Alfes, K., Shantz, A. D., Truss, C. & Soane, E. C. (2013). The link between perceived human resource management practices, engagement and employee behaviour: Moderated mediation model. The International Journal of Human Resource Management, 24(2), 330-351.

Bakker, A. B. & Bal, M. P. (2010). Weekly work engagement and performance: A study among starting teachers. Journal of Occupational and Organizational Psychology, 83(1), 189-206.

Baron, R. M. & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of personality and social psychology, 51(6), 1173-1182.

Campion, M. A., Mumford, T.V., Morgeson, F.P. & Nahrgang, J. D. (2005). Work redesign: eight obstacles and opportunities. Human Resource Management: Published in Cooperation with the School of Business Administration, The University of Michigan and in alliance with the Society of Human Resources Management, 44(4), 367-390.

Chiu, S. F. & Chen, H. L. (2005). Relationship between job characteristics and organizational citizenship behavior: The mediational role of job satisfaction. Social Behavior and Personality: An International Journal, 33(6), 523-540.

Christian, M. S., Garza, A. S. & Slaughter, J. E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. Personnel Psychology, 64(1), 89-136.

Cropanzano, R. & Mitchell, M. S. (2005). Social exchange theory: An interdisciplinary review. Journal of Management, 31(6), 874-900.

Dalal, R. S., Baysinger, M., Brummel, B. J. & LeBreton, J. M. (2012). The relative importance of employee engagement, other job attitudes, and trait affect as predictors of job performance. Journal of Applied Social Psychology, 42, E295-E325.

Farh, J. L., Podsakoff, P. M. & Organ, D. W. (1990). Accounting for organizational citizenship behavior: Leader fairness and task scope versus satisfaction. Journal of Management, 16(4), 705–721.

Fornell, C. & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39-50.

Fried, Y. & Ferris, G. R. (1987). The validity of the job characteristics model: A review and meta-analysis. Personnel Psychology, 40(2), 287-322.

Hackman, J. R. & Oldham, G. R. (1975). Development of the job diagnostic survey. Journal of Applied Psychology, 60(2), 159-170.

Hackman, J. R. & Oldham, G. R. (1976). Motivation through the design of work: test of a theory. Organizational Behavior and Human Performance, 16(2), 250–279.

Hair, J. F., Anderson, R. E., Tatham, R. L. & Black, W. C. (1998). Multivariate data analysis, 5th Edition, Prentice Hall International, New York, NY.

Harter, J. K., Schmidt, F. L. & Hayes, T. L. (2002). Business-unit-level relationship between employee satisfaction, employee engagement, and business outcomes: A meta-analysis. Journal of Applied Psychology, 87(2), 268-279.

Holbeche, L. & Springett, N. (2003). In search of meaning in the workplace, Horsham, Roffey Park.

Humphrey, S. E., Nahrgang, J. D. & Morgeson, F. P. (2007). Integrating motivational, social, and contextual work design features: A meta-analytic summary and theoretical extension of the work design literature. Journal of Applied Psychology, 92(5), 1332-1356.

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. Academy of Management Journal, 33(4), 692–724.

Kahn, W. A. (1992). To be fully there: Psychological presence at work. Human Relations, 45(4), 321–349.

Krishnan, R., Ismail, S., Loon, K. W., Muthusamy, G. & Melaka, K. B. (2017). The moderating effect of employee personality in the relationship between job design characteristics and organizational citizenship behavior. The Social Sciences, 12(6), 1014-1023.

Kumar, P. L. D. B. & Das, V. T. (2021). Mediating role of employee engagement on job characteristics and organizational citizenship behaviour – centric to Indian public sector telecom. Information Technology in Industry, 9(3), 433-440.

Lee, K. & Allen, N. J. (2002). Organizational citizenship behavior and workplace deviance: The role of affect and cognitions. Journal of Applied Psychology, 87(1), 131-142.

Marić, M., Hernaus, T., Tadić Vujčić, M. & Černe, M. (2019). Job characteristics and organizational citizenship behavior: A multisource study on the role of work engagement. Društvena istraživanja: časopis za opća društvena pitanja, 28(1), 25-45.

Menguc, B., Auh, S., Fisher, M. & Haddad, A. (2013). To be engaged or not to be engaged: the antecedents and consequences of service employee engagement. Journal of Business Research, 66(11), 2163-2170.

Nemeth, C. J. & Staw, B. M. (1989). The trade-offs of social control and innovation in small groups and organizations, Berkowitz, L. (Ed.), Advances in Experimental Social Psychology, Academic Press, New York, 22, 175-210.

Nunnally, J.C. (1994), Psychometric theory, Tata McGraw-Hill Education, New Delhi.

Organ, D. W. (1988), Organizational citizenship behavior: the good soldier syndrome, Lexington, MA, Lexington Books.

Podsakoff, P. M., MacKenzie, S. B., Paine, J, B. & Bachrach, D, G. (2000). Organizational citizenship behaviors: A critical review of the theoretical and empirical literature and suggestions for future research, Journal of Management, 26(3), 513-563.

Richman, A. (2006). Everyone wants an engaged workforce how can you create it. Workspan, 49(1), 36-39.

Robert, D. & Garvey, G. T. (1998). Incentives for helping on the job: theory and evidence. Journal of Labor Economics, 16(1), 1–25.

Rurkkhum, S. & Bartlett, K. R. (2012). The relationship between employee engagement and organizational citizenship behaviour in Thailand. Human Resource Development International, 5(2), 157-174.

Saks, A. M. (2006). Antecedents and consequences of employee engagement. Journal of Managerial Psychology, 21(7), 600 - 619.

Salanova, M. & Schaufeli, W. B. (2008). A cross-national study of work engagement as a mediator between job resources and proactive behaviour. The International Journal of Human Resource Management, 19(1), 116-131.

Schaufeli, W. B. & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior, 25(3), 293-315.

Shantz, A., Alfes, K., Truss, C. & Soane, E. (2013). The role of employee engagement in the relationship between job design and task performance, citizenship and deviant behaviours. The International Journal of Human Resource Management, 24(1)3,2608-2627.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. Sociological Methodology, 13, 290-312.

Sonnentag, S. (2003). Recovery, work engagement, and proactive behavior: a new look at the interface between nonwork and work. Journal of Applied Psychology, 88(3), 518-528.

Sugianingrat, I. A. P. W., Widyawati, S. R., da Costa, C. A. D. J., Ximenes, M., Piedade, S. D. R. & Sarmawa, W. G. (2019). The employee engagement and OCB as mediating on employee performance. International Journal of Productivity and Performance Management, 68(2), 319-339.

Todd, S. Y. & Kent, A. (2006). Direct and indirect effects of task characteristics on organizational citizenship behavior, North American Journal of Psychology, 8(2), 253-268.

Turnipseed, D. L. & Rassuli, A. (2005). Performance perceptions of organizational citizenship behaviours at work: A bi-level study among managers and employees. British Journal of Management, 16(3), 231-244.

Wollard, K. K. & Shuck, B. (2011). Antecedents to employee engagement: a structured review of the literature. Advances in Developing Human Resources, 13(4), 429-446.

Volume XIX, Issue (1) (2023) 226-231

International May Conference on Strategic Management

POSSIBILITY OF HARMLESS UTILIZATION OF CRT WASTE GLASS IN THE ART FIELD

Tatjana Miljojčić[1*], Ivana Jelić[1], Dušan Nikezić[1], Marija Šljivić-Ivanović[1], Slavko Dimović[1], Uzahir Ramadani[1], Aleksandar Savić[2]

[1]University of Belgrade, Vinca Institute of Nuclear Sciences, M.P.A. 12-14, 11351 Belgrade, Serbia; [2]University of Belgrade, Faculty of Civil Engineering, B.K.A. 73, 11000 Belgrade, Serbia

Abstract: Elevation in the electronics industry has experienced a significant increase in the amount of waste generated, resulting in the generation of a substantial amount of electrical waste (E-waste). The excessive usage and production of cathode-ray tubes (CRT), a critical component of older monitors and screens, has become a significant environmental issue globally over the past few decades. With the advent of novel technologies, CRTs have been almost entirely replaced. It is now essential to develop new and renewable methods to manage CRT glass waste. The reuse of CRT waste glass for the manufacturing of new products or as an admixture to existing ones presents a significant opportunity, and thus it is obligatory to find contemporary ways to recycle this waste. Grounded CRT waste glass has been found to have a positive impact when used as a fine aggregate, but it is classified as hazardous due to its high lead content. However, after comprehensive series of cleaning and grinding the utilization of CRT glass can be beneficial in various fields. This paper focuses on reviewing recent developments related to the reuse of CRTs, and the aim is to evaluate the feasibility of its safe application in the art field.

Keywords: e-waste, cathode-ray tubes, sustainable development, art

1. INTRODUCTION

The growing production and disposal of electronic waste, or e-waste, is a significant environmental problem worldwide (Singh et al., 2016). A major contributor to this issue is the excessive use and production of cathode-ray tubes (CRTs) in older electronic displays before the development of thin-film transistors (TFT) and liquid crystal displays (LCD). Based on data from the waste electrical and electronic equipment (WEEE) collection and pretreatment market, it has been estimated that Europe currently collects approximately 50,000-150,000 million tons per year of discarded CRTs, and this volume is not anticipated to decrease in the next several years (Andreola et al., 2007). Since CRTs have been almost entirely replaced, there is a pressing need to find new and sustainable methods to manage the hazardous glass waste they generate.

Environmental concerns such as the need for energy efficiency and the conservation of natural resources have highlighted the importance of developing a "circular economy" (Li et al., 2022). With over 40 billion tons of aggregates consumed each year, finding alternative solutions to replace natural resources is crucial (Peduzzi, 2014). Extraction of these resources

[*] *Corresponding author: tatjana.miljojcic@vinca.rs*

can have significant and long-lasting impacts on the environment, including water supplies, ecosystems, and wildlife (Hui & Sun, 2011).

Glass waste has considerable potential for recycling and reuse due to its versatile composition and various forms and appearances. In theory, it is entirely recyclable. However, if glass waste contains impurities, is broken, contaminated, or is mixed in color, it becomes impractical to recycle through the re-melting process. Recycling glass waste can help to mitigate environmental impacts and reduce the amount of waste that takes a long time to break down naturally (Bisikirskė et al., 2019).

Recent studies have shown that CRT glass waste can be used as a sustainable alternative to traditional materials, such as in the construction industry. The strength and low water absorption of CRT glass make it an ideal material to use as sand or pozzolan in construction materials (Walczak et al., 2015). Repurposing CRT waste glass in innovative and visionary ways offers both artistic and ecological benefits.

This paper explores the potential of the usage of CRT glass waste in the art field, focusing on its unique properties, benefits, and challenges, as well as notable examples of its implementation in art and design. The paper also discusses the environmental impact of e-waste and the potential of CRT glass waste to address sustainability challenges in the art industry. By doing so, this paper aims to contribute to the understanding of how waste materials can be repurposed to create meaningful and sustainable works of art.

2. IMPLICATIONS

2.1. Ecological Implications

The appropriate management of CRT glass waste is a significant environmental challenge due to the presence of hazardous materials such as lead and phosphor, which can contaminate the environment if not disposed of correctly. Incorrect disposal of CRTs can result in soil and water pollution, posing risks to human health and wildlife. As concerns about the environmental impact of e-waste continue to grow, there is an increasing interest in repurposing CRT glass waste as a sustainable alternative (Yao et al., 2018).

The use of CRT glass waste in art and design projects can have ecological benefits by diverting waste from landfills and reducing the need for traditional materials like cement or ceramics. It is known that incorporating CRT glass waste into construction materials can also reduce greenhouse gas emissions since it requires less energy to process than traditional materials (Dachowski & Kostrzewa, 2016). This also can be applied in the art domain as well, because the materials that are conventionally used and mixed with CRT waste glass can have similar properties like ceramics, sculpture, glass artwork, etc. Additionally, artists can raise awareness about the issue of e-waste and promote sustainable practices by using CRT glass waste in their work.

However, utilizing CRT glass waste in art and design also presents challenges. One major concern is the potential release of hazardous materials during the process of repurposing CRT glass waste. Researchers have developed different methods to safely handle and process CRT glass waste, such as using a mechanical crushing process to produce fine glass powder (Ling & Poon, 2011). It is also essential to consider the longevity and durability of artworks made from CRT glass waste to ensure they do not contribute to further waste generation in the future.

Despite these challenges regarding the utilization of CRTs, there are remarkable examples of artists and designers creatively incorporating waste glass into their work. Canadian artist Brent Crothers, for instance, creates sculptures that showcase interesting symbiosis of electrical and waste glass, while calling attention to the issue of e-waste. In architecture, Superuse Studios

has used crushed glass waste as an aggregate in concrete to produce a sustainable fasade for a building (Vestergaard & Jiménez, 2020).

Moreover, the incorporation of CRT glass waste in art and design offers a promising opportunity for the advancement of a circular economy. This economic model prioritizes the sustainable utilization of resources, where waste is minimized, and materials are kept in use for as long as possible. By reusing waste materials such as CRT glass to create new and valuable products, artists and designers are promoting a circular economy and minimizing the burden on natural resources.

Apart from the environmental benefits, the use of CRT glass waste in art and design can also bring about social and cultural advantages. It can promote the preservation of cultural heritage by incorporating discarded CRT glass from historical artifacts or buildings into artwork. It can also create economic opportunities for communities involved in the collection and processing of e-waste.

The repurposing of CRT glass waste in the art field is a flourishing and thrilling avenue for sustainable innovation. By adopting responsible practices and embracing the unique characteristics of this material, artists and designers can contribute to a more sustainable future while creating exceptional and meaningful works of art.

2.2. Ethical Implications

The repurposing of CRT glass waste in art and design poses ethical challenges that must be addressed. One of the foremost concerns is ensuring the safety of workers who handle and process CRT glass waste. Exposure to hazardous materials such as lead can have serious health consequences, making it crucial to implement sufficient safety measures to protect workers' health (Pauzi et al., 2019). Additionally, ethical issues related to fair labor practices and responsible sourcing of materials must be taken into account.

Another ethical concern with the use of CRT glass waste in art and design is the risk of greenwashing, which involves making false or misleading claims about a product or service's environmental benefits. It is essential to ensure that the repurposing of CRT glass waste is not a mere marketing tactic, but a genuine effort to promote sustainability and reduce e-waste.

To address these ethical concerns, several organizations and initiatives have emerged to promote responsible practices in the recycling and handling of electronic waste. For example, the e-Stewards certification program sets standards for responsible recycling and handling of electronic waste, including the protection of human health and the environment. Similarly, the Global e-Sustainability Initiative (GeSI) has created guidelines for the responsible sourcing of materials, including electronic waste (Airike, 2016).

In the art world, organizations such as the Sustainable Arts Foundation promote sustainability in the arts, including the use of recycled materials. Artists and designers should consider the ethical implications of their work and strive to uphold responsible practices when repurposing CRT glass waste.

In summary, repurposing CRT glass waste in art and design presents ethical challenges, but it also offers opportunities to promote sustainability and responsible practices. By implementing sufficient safety measures, maintaining fair labor practices, and avoiding greenwashing, artists and designers can contribute to a more ethical and sustainable future.

2.3. Artistic Implications

The use of CRT glass waste in art and design presents unique artistic implications that can contribute to a more sustainable future. By incorporating discarded electronics into their

work, artists have the opportunity to create pieces that reflect our society's relationship with technology and e-waste. The use of unconventional materials can also challenge traditional notions of art and expand the possibilities of what can be considered artistic expression.

One example of the use of waste glass in art is the work of artist Josh Simpson. Simpson creates intricate glass spheres that incorporate various materials, including CRT glass waste. His pieces reflect both the beauty and the environmental implications of our technology-focused society. Another artist, Jeremy Mayer, uses the parts of discarded typewriters and other machinery to create detailed sculptures, including a life-size human figure.

The use of CRT glass waste in art offers an opportunity to explore environmental, technological, and societal themes while promoting sustainable practices. As artists continue to experiment with repurposed materials, it will be interesting to see how this trend shapes the future of art. For example, artist Nathaniel Stern's interactive installation, "The Giverny Series," uses old televisions, monitors, and computers to create a digital garden in which viewers can immerse themselves. The artwork invites reflection on our relationship with technology and nature and how we can create more sustainable futures.

However, there are also artistic implications related to the use of CRT glass waste in art. The incorporation of hazardous materials into art pieces raises questions about the long-term preservation and conservation of the artwork. Additionally, the use of materials such as CRT glass waste may limit the accessibility of the artwork, as not all galleries or collectors may be willing to handle potentially hazardous materials.

To address these concerns, some artists and organizations have developed strategies for handling and processing CRT glass waste responsibly. For example, artist Dan Chen uses a sandblasting technique to remove any hazardous materials from the waste glass before incorporating it into his sculptures. The Sustainable Arts Foundation promotes the use of recycled materials in art and provides resources for artists to incorporate sustainable practices into their work.

Overall, the use of CRT glass waste in art and design presents unique opportunities and challenges for artists and designers to explore environmental, technological, and societal themes while promoting sustainable practices. By continuing to experiment with repurposed materials, artists can push the boundaries of traditional art and contribute to a more sustainable future.

3. CHALLENGES AND LIMITATIONS

One of the primary challenges of incorporating CRT glass waste into art is the potential health risks associated with handling hazardous materials. CRT glass typically contains substances such as lead, which can pose a threat to artists and others who work with the material. As a result, artists who are interested in using CRT glass waste in their work may face significant barriers to entry, including the need for proper equipment and facilities to ensure safe handling. Furthermore, the presence of potentially hazardous art materials can also act as a deterrent for galleries or collectors to showcase or acquire certain artworks. As a result, this can restrict the public's access to these pieces, which can have significant implications for the preservation and accessibility of such works of art, as well as for the artists who create them.

Another challenge associated with the use of CRT glass waste in art is the limited availability of the material. As CRT technology has become outdated, the supply of CRT glass waste has decreased, making it difficult for artists to obtain the necessary amount to complete their projects. Legal restrictions on the disposal and transportation of hazardous waste, including CRT glass, can also pose significant challenges for artists seeking to obtain the material (Williams et al., 2008).

Furthermore, the incorporation of CRT glass waste into art can raise questions about the long-term preservation and conservation of the artwork. The material is not designed to last for long periods, and the inclusion of hazardous substances can make it difficult to ensure the preservation of the artwork without risking the safety of those who handle it (Premalatha et al., 2014).

Despite these challenges, some artists have found innovative ways to use CRT glass waste in their work. For example, Marpi Studio has created interactive installations that explore themes of technology and e-waste, incorporating glass waste into the work. Similarly, artist Laura J. Lawson has used glass waste to create intricate sculptures that comment on society's relationship with technology and consumption.

Overall, while using CRT glass waste in art presents challenges and limitations, it also offers opportunities for artists to explore environmental themes and promote sustainable practices. As more artists experiment with repurposed materials, it will be essential for the art world to consider the health risks and environmental implications associated with these materials. By doing so, artists can continue to push the boundaries of what is possible with e-waste, inspire others to consider the environmental impact of their practices and contribute to a more sustainable future.

4. CONCLUSION

Aside from its artistic implications, repurposing CRT glass waste in art can have a significant impact on sustainability and the environment. By finding new uses for this material, we can reduce the amount of electronic waste that is improperly disposed of, ultimately lessening its negative impact on the environment.

However, as previously mentioned, there are also ethical and health concerns that need to be addressed when working with hazardous materials like CRT glass waste. It is essential to manage the potential risks associated with handling these materials carefully, and artists must prioritize the health and safety of those who work with them.

Despite these challenges, the growing interest in using CRT glass waste in art presents an opportunity for creative solutions to environmental problems. Through their work, artists, designers, and researchers can promote sustainable practices and encourage others to reflect on the environmental impact of their own practices.

Moving forward, it is crucial to continue exploring the potential of CRT glass waste in art while also being mindful of the ecological and ethical implications of this work. By doing so, we can promote more sustainable practices in the art world while also inspiring new and innovative forms of creative expression.

REFERENCES

Airike, P. E., Rotter, J. P., & Mark-Herbert, C. (2016). Corporate motives for multi-stakeholder collaboration–corporate social responsibility in the electronics supply chains. Journal of cleaner production, 131, 639-648.

Andreola, F., Barbieri, L., Corradi, A., & Lancellotti, I. (2007). CRT glass state of the art: A case study: Recycling in ceramic glazes. Journal of the European Ceramic Society, 27, 1623-1629.

Bisikirskė, D., Blumberga, D., Saulius, V., & Skripkiunas, G. (2019). Multicriteria Analysis of Glass Waste Application. Environmental and Climate Technologies, 23(1), 152-167.

Dachowski, R., & Kostrzewa, P. (2016). The Use of Waste Materials in the Construction Industry. Procedia Engineering, 161, 754-758.

Yao, Z., Ling, T. C., Sarker, P. K., Su, W., Liu, Jie., Wu, W., & Tang, Junhong. (2018). Recycling difficult-to-treat e-waste cathode-ray-tube glass as construction and building materials: A critical review. Renewable and Sustainable Energy Reviews, 81(1), 595-604.

Li, J., Song, G., Cai, M., Bian, J., & Mohammed, B. S. (2022). Green environment and circular economy: A state-of-the-art analysis. Sustainable Energy Technologies and Assessments, 52, 102-106.

Ling, T.C., & Poon, C. S. (2011). Utilization of recycled glass derived from cathode ray tube glass as fine aggregate in cement mortar. Journal of Hazardous Materials, 192(2), 451-456.

Pauzi, N. N. M., Jamil, M., Hamid, R., Abdin, A. Z., & Zain, M. F. M. (2019). Influence of spherical and crushed waste Cathode-Ray Tube (CRT) glass on lead (Pb) leaching and mechanical properties of concrete. Journal of Building Engineering, 21, 421-428.

Peduzzi, P. (2014) Sand, rarer than one thinks. Environmental Development, 11, 208–218.

Premalatha, M., Abbasi, T., & Abbasi, S. A. (2014). The Generation, Impact, and Management of E-Waste: State of the Art. Critical Reviews in Environmental Science and Technology, 44(14), 1577–1678.

Singh, N., Wang, J., & Li, J. (2016). Waste cathode rays tube: An assessment of global demand for processing. Procedia Environmental Sciences, 31, 465–474.

Vestergaard, I., & Jiménez, G. M. (2020). Exploring secondary resources in an architectural project. Built environment and architecture as a resource, 2020(1), 107-130.

Walczak, P., Małolepszy, J., Reben, M., & Rzepa, K. (2015). Mechanical Properties of Concrete Mortar Based on Mixture of CRT Glass Cullet and Fluidized Fly Ash. Procedia Engineering, 108, 453-458.

Williams, E., Kahhat, R., Allenby, B., Kavazanjian, E., Kim, J., & Xu, M. (2008). Environmental, Social, and Economic Implications of Global Reuse and Recycling of Personal Computers. Environmental Science & Technology, 42(17), 6446–6454.

Hui, Z., & Sun, W. (2011). Study of properties of mortar containing cathode ray tubes (CRT) glass as replacement for river sand fine aggregate. Construction and Building Materials, 25, 4059–4064.

Volume XIX, Issue (1) (2023) 232-241

International May Conference on Strategic Management

THE ENTREPRENEURSHIP AND THE MOROCCAN'S ECONOMIC DEVELOPMENT MODEL

Nassimi Abdelhakim, Alaiadi Yassine*

National school of trade and management, University of Abdelmalik Essaâdi, Morocco

Abstract: Being part of the global economy poses countless and substantial challenges to organizations and industries around the world. On the one hand, to survive, keep up with the advances and lead in the difficult world is difficult, on the other hand, it opens various new and unexplored doors of opportunities. Entrepreneurship, which is one of the most powerful economic forces, empowers individuals to seek opportunities where others find intractable problems. Entrepreneurship is the symbol of business tenacity and success; it is a vital source of change in all facets of society.

Keywords: entrepreneurship, enterprising, agent of change, mindset, state of mind

1. INTRODUCTION

With the advent and rapid developments in the field of technology and the forces of globalization, the world has become a global village, characterized by explosive growth in business and international competition.

Being part of the global economy poses countless and substantial challenges to organizations and industries around the world. On the one hand, to survive, keep up with the advances and lead in the difficult world is difficult, on the other hand, it opens various new and unexplored doors of opportunities. Entrepreneurship, which is one of the most powerful economic forces known to mankind, empowers individuals to seek opportunities where others find intractable problems.

Entrepreneurship is the symbol of business tenacity and success; it is a vital source of change in all facets of society.

Entrepreneurs, with their inherent intelligence, drive and hard work, have made the most of the opportunities presented to them. They have historically changed the direction of national economies, industries or markets. They invented new products, developed organizations and launched explosions in new technologies. They forced the relocation of resources from existing users to new ones, more productive users. Many entrepreneurial innovations have transformed the society in which we live and enjoy the results.

2. DEVELOPMENT OF THE CONCEPT OF ENTREPRENEURSHIP – HISTORICAL OVERVIEW

The term entrepreneur, in French, if translated literally, means "intermediary" and has been used since the 12th century. An early example of an entrepreneur as an intermediary is

* *Corresponding author: yassine.alaiadi@gmail.com*

Marco Polo, who attempted to establish trade routes to the Far East. As an intermediary, Marco Polo will sign a common contract with a provider of capital (capitalist) to sell his goods, which granted a loan to the merchant-adventurer at a high price. Interest rate, including insurance. The capitalist, passive bearer of risk, and the trader, bearer of physical and emotional risk used to trade the goods. After the merchant had completely sold the good, the profits were split between the two, with the capitalist taking about 70-75%, while the merchant-adventurer received the remaining 25-30%.

In the middle Ages, the dominant feudal system in Europe hindered the development of entrepreneurship. In the 17th century, the term contractor was used to refer to a person who entered into a contract of arrangement with the government to perform a service or supply stipulated products since the contract price was fixed, all resulting profits or losses belonged to the contractors, thus assuming the risk arising from its shipment. Richard Cantillon, a renowned 17th century French economist, developed one of the first theories of the entrepreneur and is credited as the founder of the term. He saw the entrepreneur as a risk taker, observing the gaps between supply and demand and the options to buy low and sell high. He defines an entrepreneur as a trader or farmer "who buys at a certain price and sells at an uncertain price, and bears the risk of exploitation"

In the 18th century, feudalism was eliminated and the legal and institutional conditions changed with the emergence of the joint-stock company. During this period, the person with capital was different from the one who needed capital. In other words, the entrepreneur was distinguished from the provider of capital. One of the reasons for this differentiation was the industrialization that occurred throughout the world. Many of the inventions developed during this time were reactions to the changing world.

It was not until the 19th century that entrepreneurs were considered from an economic point of view. The entrepreneur organizes and operates the business for personal purposes. He pays market prices for materials consumed in the business, for the use of land, for the personal services he employs, and for the capital he requires. He brings his own initiative, skills and ingenuity in business planning, organization and administration. It also assumes the risk of loss and gain resulting from unforeseen events and uncontrollable circumstances. The net residual of annual business receipts after deducting all costs paid, he retains (Ely & Hess, 1937). In the middle of the 20th century, the first economist who took an interest in the role of entrepreneurship in economic development through innovation was Joseph A. Schumpeter. In his own words, "The function of the entrepreneur must reform or revolutionize the mode of production by exploiting an invention or more generally, an unproven technological method of producing a new product or producing an old one, a new way, to open a new source of supply of materials or a new outlet for products, by organizing a new industry (Schumpeter, 1952).

3. ENTREPRENEUR AND ENTREPRENEURSHIP: CONCEPTUAL FRAMEWORK

3.1. Definition of entrepreneur and entrepreneurship

Entrepreneur: The word entrepreneur has its origins in a French word "entrepreneur," which means "to undertake." In the early 16th century, the term was used to refer to people engaged in military expeditions.

In the 17th century, it widened to cover building and civil engineering works. The term was used in the context of commercial and economic activities only in the 18th century. Richard Cantillon, a French banker, is credited with using the word "entrepreneur" for the first time to refer to a person who bears uncertainty and risk. According to Richard Cantillon, "An agent

who buys factors of production at certain prices in order to combine them into a product in order to sell it at an uncertain price in the future".

An entrepreneur is one who always seeks change, responds to it and exploits it as an opportunity. This means that the entrepreneur makes a decision about obtaining and using resources while assuming the business risk. There is no one way to define an entrepreneur. Different scholars have defined an entrepreneur differently. A look at various definitions will help to understand the concept in depth.

According to Oxford Dictionary, "An entrepreneur is someone 'who sets up a business or businesses, taking financial risks in the hope of profiting from them'. Jean Baptiste Say (1767-1832) broadened the ideas of Cantillon and conceptualized an entrepreneur as "an economic agent who brings together all the means of production, land of one, labor of the other and capital of the other. Another who thus manufactures a product. By selling the produce in the market, he pays the rent of the land, the wages of labor, the interest on capital and what remains to him is his profit" (Say, 1827)

Innovation is a key tool of entrepreneurs, by which they exploit an opportunity for a different business or different service and Joseph Schumpeter defined an entrepreneur as an innovator. In his words, "The entrepreneur in an advanced economy is an individual who introduces something new into the economy – a method of production not yet tested by experience in the manufacturing branch, a product with which consumers do not are not yet familiar, a new source of raw material or new markets and so on »

Innovation, creativity and risk taking are an integral part of entrepreneurship. It involves the ability to create and conceptualize something new, which can consist of anything from a new product to a new distribution system and a method to developing a new organizational structure.

Entrepreneurship: Although there is no official definition of entrepreneurship, the following has evolved from work done at Harvard Business School and is now generally accepted by authors: "Entrepreneurship is the process of creating or seizing an opportunity and pursuing it regardless of the resources currently controlled" (Timmons, 1994). Drucker says "entrepreneurship is 'risky' primarily because so few would-be entrepreneurs know what they are doing." He further proposed that "entrepreneurship" is a practice. What this means is that entrepreneurship is not a state of being, nor is it characterized by making plans that are not followed through.

Entrepreneurship begins with action and the creation of a new organization. This organization may or may not become self-sustaining and, in fact, may never generate significant revenue. But, when individuals create a new organization, they have entered the paradigm of entrepreneurship.

Entrepreneurship, according to Onuoha (2007) is "the practice of starting new organizations or revitalizing mature organizations, especially new businesses usually in response to opportunities."

For an economist, an entrepreneur is a person who brings resources, labor, materials and other assets, combinations that make their value greater than before, and also one who introduces changes, innovations and new order. For the psychologist, such a person is usually motivated by certain forces - the need to obtain or achieve something, to experiment, an entrepreneur appears as a threat, a competing aggressor. Whereas for another businessman, the same entrepreneur may be an ally, a source of supply, a customer, or someone who creates wealth for others, as well as finds better ways to use resources, downsize and produce jobs, others are hard to get (Vesper, 1980)

Entrepreneurship is the dynamic process of creating ceremonial wealth. Wealth is created by people who assume the major risks in terms of equity, time and/or career commitment or the

value of certain products or services. The product or services may or may not be new, unique, but the value must somehow be infused by the entrepreneur by receiving and locating the necessary skills and resources (Ronstadt, 1984).

From the definitions above, entrepreneurship can be summed up as nothing more than the process of creating something new with value, including responding to available opportunities. It involves time, effort and risk taking, with the hope of receiving the rewards in the end. Rewards can take any form - monetary or non-monetary (personal satisfaction).

3.2. Characteristics of contractors

Several research studies have been conducted to identify the characteristics/traits of a true entrepreneur. Although there are no specific, universally accepted characteristics that have been shown to be possessed by all entrepreneurs, but there are few traits that most successful entrepreneurs possess. These include:

- *Motivation:*

Entrepreneurs are passionate, dynamic and highly motivated. They have high energy levels and are always ready to take initiative. They are always thinking about their business and how to increase market share, how to improve their existing processes.

- *Risk tolerance:*

Establishing any entrepreneurial venture is risky and the entrepreneur must assume the risk. As risk and rewards are inseparable, to grow, the entrepreneur must have a great appetite for taking on risk.

- *Vision:*

One of the major responsibilities of an entrepreneur, as founder and business leader, is to decide where the business should go. This requires a strong vision from an entrepreneur.

- *Mental capacity and creativity:*

The entrepreneur must anticipate changes and be able to study the different situations in which decisions must be made. Successful entrepreneurs have the creative ability to recognize and pursue opportunities. They are always looking for new ways of doing things, launching new products, providing new services, etc.

- *Clear objectives :*

An entrepreneur has a clear idea of the objectives to be achieved in the business, the nature of the goods to be produced and the subsidiary activities to be undertaken. This clarity of goals helps them translate their business idea into reality.

- *Good communication skills:*

It's all about communicating effectively. An entrepreneur who can communicate effectively with customers, employees, suppliers and creditors will be more likely to succeed than an entrepreneur who does not.

- *Human skills:*

The most important personality factors that contribute to the success of any entrepreneur include emotions, good interpersonal relationships... An entrepreneur must maintain the good

relationships with his customers in order to encourage them to continue patronizing his business. He must also maintain good relations with his employees in order to motivate them to carry out their work with a high level of efficiency.

3.3. Duties of an entrepreneur

There are different functions that an entrepreneur performs. A few of the most important are discussed below.

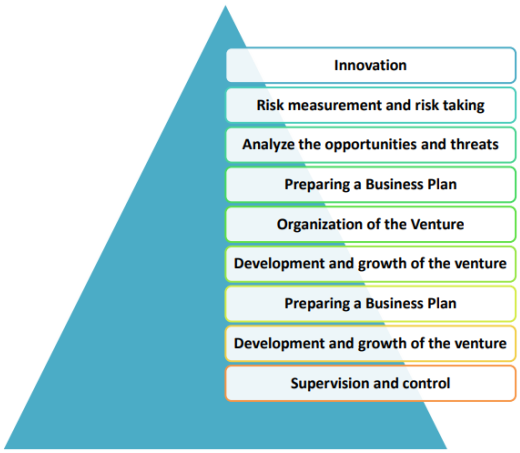


Figure 1. Functions of an entrepreneur

3.3.1. Innovation

Innovation and creativity are at the heart of the functions of an entrepreneur. According to Schumpeter (1934), the key ingredient of entrepreneurship is the individual's spirit of innovation. Innovation involves doing new things or doing the same things in a new way. It can be: the introduction of a new product or service, new production methods, the discovery of new markets or the search for new sources of material, etc.

3.3.2. Measurement and risk taking

- Interpersonal Skills: The ability to establish and maintain positive relationships with customers and, employees, financial lenders, investors, lawyers and accountants, among others, is crucial to the success of the entrepreneur's business enterprise.
- Basic management skills: Even though entrepreneurs hire other people to take care of the day-to-day tasks of the business, entrepreneurs need to know if their business has the right resources.
- Leadership skills: The ability to develop a vision for the business and inspire employees to pursue it is imperative for success.

Palmer (1971) suggested that the entrepreneurial function primarily involves risk measurement and decision making. Risks are not only related to uncertainty about the success of the new business venture, but also on a personal and professional level, such as missed career opportunities for the sake of starting the new business family relationship and mental well-being.

Although risk taking is unavoidable, entrepreneurs prefer to take moderate risks in these situations, where they have some control. They do not prefer situations that involve either extremes of risk or certainty.

3.3.3. Analyze opportunities and threats

An entrepreneur must be a seeker of opportunities. The environment can present several opportunities before an entrepreneur. He must analyze such opportunities from time to time and choose the most attractive one at the right time to start a new business. He must possess the ability and skills to formulate strategies for the new business, keeping threats in mind, be adventurous.

3.3.4. Prepare a business plan

A business plan is a written document containing details of every aspect of the proposed business venture. It is a tedious task to write a convincing and viable business plan. Preparing a business plan is necessary to convince potential investors and financial institutions of the viability of venturing in order to finance it and to provide a roadmap for people inside the organization.

3.3.5. Business organization

The entrepreneur brings together various factors of production like capital, labor, machinery, land and construction etc. to start a business. He must have the appropriate skills to deploy the appropriate resource in the right activity at the right time to avoid wastage and make optimal use of the resource in starting the new business.

3.3.6. Business development and growth

Many of the newly created businesses are not able to survive for long. They require active involvement of the entrepreneur during the development and growth phase as well. During the growth phase of a new business, when it begins to gain momentum, the entrepreneur should delegate routine activities to other colleagues/subordinates in the organization while providing vision and strategic direction to the company as a leader.

3.3.7. Supervision and control

When day-to-day business is delegated to subordinates, it becomes imperative to have proper oversight of the mechanisms put in place so that the entrepreneur can monitor the overall welfare of the business. Personnel, observation, reporting and more sophisticated monitoring techniques may need to be employed.

3.4. Types of contractors

There are several ways to classify entrepreneurs. They can be categorized on the basis of business type, technology use, gender, motivation, organization and many more. But here we will discuss two most important classifications based on previous research.

Clarence Danhof, based on his study of American agriculture, classified entrepreneurs in the way that at the initial stage of economic development, entrepreneurs have less initiative and

drive and as economic development continues, they become more innovative and enthusiastic (Gupta & Khanka, 2010). Based on this, he classified entrepreneurs into four categories:

- Innovative entrepreneurs: Prevalent in developed countries, an innovative entrepreneur is one who introduces new goods and services, introduces new production methods, experiments with new processes, discovers a new market and restructures the company. It is important to note that these entrepreneurs may only operate when a certain level of development has already been achieved, and people look forward to change and improvement.
- Imitative Entrepreneurs: Found mostly in developing/underdeveloped countries, this category of entrepreneurs is characterized by their eagerness to adopt successful innovations that have already been pioneered. They value existing innovations created by innovative entrepreneurs, can be developed economies. Imitative entrepreneurs do not innovate the changes themselves, they only imitate the techniques and technology innovated by others.
- Fabian entrepreneurs: Fabian entrepreneurs are those who do not have the will to adopt new production methods. They demonstrate great vigilance and apprehension in experimenting with any change in their business. They imitate only when it becomes abundantly clear that failure to do so would result in a loss of the relative position of their company. They are slow and hesitant to adopt even successful novelties.
- Drone contractors: Drone contractors are referred to those who refuse to take opportunities to make changes in existing production methods, despite earning extremely reduced returns compared to other growers, who have adopted new advanced technologies methods. Sometimes these entrepreneurs may even suffer losses, but they are not ready to make changes in their existing production methods. They struggle to exist, not to grow. So they are idlers because they choose to continue to work in a conventional way and resist change.

4. ENTREPRENEURSHIP AND THE MOROCCAN ECONOMIC DEVELOPMENT MODEL

4.1. The context of appearance

Morocco places the promotion of entrepreneurship as a national priority to move towards a transforming, efficient and inclusive development model, underlined the Minister of Economic Inclusion, Small Business, Employment and Skills, Younes Sekkouri. The latter, who spoke at the opening of the first virtual exhibition of entrepreneurship and small business "CRI entrepreneurship Expo", initiated by the regional investment council (CRI) Marrakech-Safi, noted that the government has placed this issue at the heart of its concerns and major initiatives will be launched shortly.

In this context, he pointed out that the new development model (NMD) places the act of entrepreneurship at the center of the development desired by the Kingdom, under the enlightened leadership of His Majesty King Mohammed VI.

The Moroccan path for development is intended to be entrepreneurial, energy-liberating, egalitarian (in the gender sense) and societal beyond the sole dimension of growth and economic development as such, noting that the objective being to contribute to apply for our country in many areas in the upper thirds of the various world rankings of nations by 2035.

4.2. Development objectives

To achieve this ambition, Morocco will have to meet many challenges and achieve a catch-up fueled by significant progress in areas marked by significant deficits, which would constitute obstacles to development if they were not significantly improved, such as quality education, women's participation or water conservation. It will also be necessary to boldly seize all the opportunities available to Morocco to accelerate its development, by taking bets on the future and objectives of excellence in strategic and transformational areas. Achieving the ambition requires simultaneously addressing five interdependent and complementary development goals, which are prosperity, empowerment, inclusion, sustainability, and regional leadership in targeted areas, through bets bold future. Below is a summary description of these five objectives:

- A Prosperous Morocco, which creates wealth and quality jobs to match its potential
- A Morocco of Skills, where all citizens have the skills and enjoy the well-being allowing them to take charge of their life project and contribute to the creation of value
- An Inclusive Morocco, which offers opportunities and protection to all and where social ties are consolidated:
- A Sustainable Morocco, where resources are preserved, in all territories
- A Bold Morocco, regional leader in targeted areas of the future

5. ENTREPRENEURIAL INNOVATION PROGRAM

One of the main objectives of the New Development Model (NMD) is to create the conditions for Morocco to take advantage of all of its assets by becoming a nation of opportunity, entrepreneurship and innovation. And to do this, the formation of human capital occupies a prominent place in the recommendations of the report of the Special Commission. R&D and innovation are also high on the ranks of the Kingdom's development priorities.

In order to structure the actors of the social economy and bring out a new generation of innovative social entrepreneurs, the New Development Model recommends setting up support programs dedicated to social entrepreneurship in the territories, in particular through specialized incubators, to develop research and development centers for social innovation, in collaboration with higher education establishments, intended to develop and disseminate innovative practices that produce impact, and to create a new legal status adapted to social enterprise. It is also a question of enhancing intangible capital and promoting research and innovation in all sectors (Economy, Higher Education, Research, etc.). The NMD also advocates the establishment of a favorable framework to promote innovation within companies and to bring out startups of regional and global dimension. And, it is precisely the ambition of the P.I.E.

In its construction and deployment approach, the P.I.E is based on the principles and guidelines of the New Development Model, i.e. integrating the various stakeholders from the design phase, namely trainees, trainers, pedagogical and administrative managers, invest in the training of trainers so that they become the guarantors of learning about entrepreneurship through a system of skills development based on 4 dimensions: training, coaching, experimentation and change. The P.I.E approach also aims to develop the whole system in order to achieve the impact of a change in mindset (state of mind), to structure learning through experimentation, to give pride of place to creative ideas, and create a melting pot between aspiring entrepreneurs from the P.I.E with the region's economic ecosystem. Similarly, the OFPPT roadmap is fully in line with the new orientations.

"This roadmap, which capitalizes on the achievements of the vocational training sector, aims to upgrade the training offer and the restructuring of the sectors according to their relevance on the job market, as well as the modernization of teaching methods and the improvement of the employability of young people through a series of short-term training and requalification programs", said Saaïd Amzazi, former Minister of National Education, Vocational Training, higher education and scientific research, during the presentation of this large-scale project in 2019. It should be noted that the objective of this roadmap is also to create a new generation of vocational training centers, materialized by Cités trades and skills, multi-sectoral and multi-functional structures, which each region will have.

6. CONCLUSION

The employment's world has completely changed, and it is important for everyone to be ready to enter the job market with new skills, know-how / attitudes expected in the market.
Beyond the possibilities that Entrepreneurship offers to create sustainable businesses in our regions, is in the first lever for changing mindsets and learning new skills.

Not everyone can become an entrepreneur, but everyone can become an entrepreneur. Not everyone will want to open their business but we want everyone to want to participate in the creation of a new economy in our region based on fundamental values such as:

- sharing, learning,
- surpassing oneself,
- the creation of collective value,
- the notion of responsibility,
- commitment,
- continuous learning,
- the search for excellence.

Excellence, for example, we invite us to push back the frontiers of field learning to bring out the best in ourselves.

REFERENCES

Ely, R. T., & Hess, R. H. (1937). Outlines of Economics, 6th Ed. New York: Mac Milan.
Ries, E. (2012). Lean startup: adoptez l'innovation continue. Pearson.
Gupta, C. B., & Khanka, S. S. (2010). Entrepreneurship and small business management. Sultan Chand & Sons, New Delhi. Onuoha G., (2007) Entrepreneurship, AIST International Journal 10, 20-32.
Palmer, M. (1971). The application of psychological testing to entrepreneurial potential. California management review, 13 (3), 32-38.
Ronstadt, R. C. (1984). Entrepreneurship, Dover, MA: Lord Publishing Co.
Say, J. B. (1827). Production, Distribution and Consumption of Wealth, John Grigg, Philadelphia.
Schumpeter, J. (1952). Can Capitalism survive, New York: Harper and Row.
Special Commission on the Development Model (CSMD) (2021). The new model on development.

Timmons, J. A. (1994). New Venture Creation: Entrepreneurship for the 21st Century. Fourth edition. Irwin Press, Burr Ridge, IL.
Vesper, K. (1980). New Venture Strategies, Englewood Cliffs, NJ: Prentice Hall.

Volume XIX, Issue (1) (2023) 242-251

International May Conference on Strategic Management

EMPOWERING FEMALE ENTREPRENEURS IN DEVELOPING COUNTRIES: A COMPARATIVE CASE STUDY ON THE IMPACT OF SOCIAL MEDIA ON MICROENTERPRISES AND POVERTY ALLEVIATION

Soukaina Allioui*, Khalid Chafik
Research Group "Management & Information systems," National School of Business and Management of Tangier, Abdelmalek Essaadi University, Tangier, Morocco

Abstract: This paper explores the impact of social media on female entrepreneurs in developing countries, with a focus on microenterprises and poverty alleviation. The paper uses a comparative approach, combining desk research with an analysis of recent case studies from various developing countries, to examine how digitalization through social media can be used to overcome traditional barriers and enhance the competitiveness and growth potential of female entrepreneurs' businesses. The study investigates the extent to which social media platforms can be utilized to increase visibility, access to markets, and financial resources for female entrepreneurs, ultimately leading to the alleviation of poverty and economic empowerment. In addition, the study will shed light on the obstacles female entrepreneurs confront in adopting technology, gaining access to it, and utilizing it in the present context. This article contributes to the literature on female entrepreneurship and economic development by emphasizing the significance of leveraging digital technologies to promote inclusive economic growth. This research has the potential to inform future policies and programs designed to promote entrepreneurship and reduce poverty in developing countries, particularly among women.

Keywords: Female entrepreneurship, Poverty, social media, Microenterprises, Developing countries

1. INTRODUCTION

In recent years, it has been recognized that entrepreneurship plays a vital role in boosting economic development (Carree & Thurik, 2010). As such, the role of women in entrepreneurship may be particularly crucial in achieving sustainable development, particularly in the context of poverty alleviation. Studies by the Global Entrepreneurship Monitor have found that women's entrepreneurship has played a vital role in the economic growth of numerous countries, particularly those in the early stages of development (Tsyganova & Shirokova, 2010). Entrepreneurship by women has played a significant role in economic growth in various countries, particularly in emerging markets. It is also becoming a crucial source of employment for women globally. Several studies, including those conducted by the Global Entrepreneurship Monitor (GEM), demonstrate that economic growth is strongly correlated with factors such as the female participation rate (GEM, 2022). Successful female entrepreneurs

* *Corresponding author: soukaina.allioui@etu.uae.ac.ma*

can have a significant impact on their families, communities, and local and regional economies. They can act as change agents, inspiring others to become self-reliant and pursue entrepreneurship. Their success can contribute to the overall growth and development of the nation (Shah & Saurabh, 2015).

In this context, the use of new technologies such as social media platforms have emerged as powerful tools for enabling female entrepreneurs to overcome barriers, access new markets, resources, and opportunities. In this article, we aim to examine the impact of social media on female microentrepreneurs in developing countries, and its potential for alleviating poverty. Social media platforms have become increasingly popular among entrepreneurs as a low-cost marketing and communication tool, providing a new avenue for women to expand their businesses and connect with customers and suppliers.

With the above in mind, the contemplated research will attempt to provide an understanding of the challenges faced by female entrepreneurs. To achieve this understanding, this study employs a combination of desk research and comparative approach by analyzing recent case studies from different developing countries on the topic. The Desk research method involves the collection and analysis of existing data and information from secondary sources to provide a broad understanding of the current state of female entrepreneurship, as well as the challenges and opportunities that women face in this field. Comparative approach, on the other hand, involves the analysis of similarities and differences between the case studies which will allow us to compare the experiences of female entrepreneurs in different countries and cultural contexts. By combining desk research and comparative approach, this study aims to provide a comprehensive and nuanced understanding of the role of social media in supporting women's entrepreneurship and poverty reduction.

The paper's structure is as follows: the second section involves three subparts, first one presents a brief overview on the role of microenterprises in female entrepreneurship, second one compares recent case studies on the topic, third one consists of a summary table for all the case studies presented previously. The third section is devoted to examine the impact of social media on entrepreneurship and discuss the potential of social media for women-led microenterprises with a presentation of case studies and a summary table for them. The reached discussions in the Moroccan context are presented in section four. The final section consists of the primary conclusions, summary of all the case studies and perspectives for Morocco in future articles.

2. THE RISE OF MICROENTERPRISES IN FEMALE ENTREPRENEURSHIP

In recent years, there has been a significant increase in the number of microenterprises led by women entrepreneurs. These small-scale businesses are often started with limited capital and resources, but with sheer determination and grit, female entrepreneurs have been able to turn their ideas into successful ventures. In this section, we will delve deeper into the rise of microenterprises in female entrepreneurship by analysing case studies elaborated in Southeast Asian Nations, Tunisia, Ghana and Pakistan, to explore the unique challenges faced by women-led microenterprises.

2.1. Female entrepreneurship in microenterprises within emerging countries

There has been a recent surge in attention and acknowledgement towards the significant contribution of women entrepreneurs to the socioeconomic progress of the global economy. The Global Entrepreneurship Monitor (GEM) has revealed that women alone make up 66% of the global workforce, and more than half of the world's food production is carried out by

women. These findings are a testament to the essential role that women play in the advancement of society and the improvement of livelihoods.

Researchers have begun to study the potential for small businesses to contribute to economic prosperity (Salim & Anis, 2021) by creating jobs, generating income, and promoting economic development in local communities. Studies have shown that microenterprises can be an important source of income for low-income individuals and can play a crucial role in reducing poverty and inequality (Vial, 2011). In addition, microenterprises can also serve as a means for entrepreneurs to gain valuable business skills and experience, which can lead to the creation of larger, more successful businesses in the future (Bruton et al., 2008).

Female entrepreneurship in microenterprises in developing countries is an important factor in economic growth and poverty reduction. Women are often the primary caregivers in their families and are often the ones who are responsible for providing for their families and meet their basic needs (Asli, 2018). Women are also often the ones who are most likely to start a business in a developing country. They are also seen as key drivers of economic growth, as they create jobs, stimulate economic activity, and promote innovation. Studies have shown that micro-enterprises are essential for the well-being and continued existence of numerous individuals in South Africa and other developing countries (Herrington et al., 2010).

Female entrepreneurs in microenterprises in these countries often face in starting and growing businesses limited access to finance, education, and the persistent gender disparities that hinder their full participation in the global economy. As in many other areas, the rules and systems have been designed based on male norms and behaviours, meaning they are not truly gender-neutral. The largest gender gap in entrepreneurship was found in Middle East & Africa, where 9.8% of women and 14.7% of men are taking steps to start a business (GEM, 2022).

As result of COVID 19, women of Middle East and Africa agreed that the pandemic has created new business opportunities for them (37.1% women vs. 29.8% men), the Middle East and Africa region saw some of the most significant trends in women's entrepreneurship, with extremely high entrepreneurial intentions but very low startup rates (GEM, 2022).

2.2. Presentation of case studies

2.2.1. Southeast Asian Nations case study (2023)

In their recent research, Chikh-Amnache and Mekhzoumi (2023) utilized a panel mm-qr approach to examine the influence of female entrepreneurship on economic growth in ASEAN countries. The results demonstrated that female entrepreneurship contributes to diverse advantages for the economies of ASEAN nations, such as enhancing the labour force and promoting economic diversification and innovation. Nevertheless, the study uncovered a significantly adverse impact of the Gender Inequality Index, which dissuades women from working. This gender inequality also obstructs women from receiving the necessary education and training for the workforce. Additionally, gender disparity makes it difficult for women to start and expand their businesses, which can cause poverty, crime, and social unrest. The recommendations provided in the study are to ensure sustained and equitable economic growth that supports women in balancing work and family obligations in ASEAN countries. These include passing laws related to family responsibilities, providing reliable and affordable childcare. Women entrepreneurs should receive education, retraining, and opportunities for growth. Equal pay for equal work policies and specific programs. Access to information and communication technology, digital media, and global interconnectivity can aid in women's development and enable them to start businesses.

2.2.2 Tunisia case study (2021)

Salim and Anis (2021) conducted a study to investigate the impact of female entrepreneurship on economic and social development in Tunisia. The study found that start-up businesses are a crucial driver of economic development, leading to increased employment opportunities, income distribution, wealth creation, and poverty reduction. The hypothesis that economic growth is positively affected by women's entrepreneurship was supported by several tests, including The Granger causality test. The econometric analysis conducted showed that entrepreneurship plays a significant role in promoting entrepreneurship and that female entrepreneurship contributes significantly to economic development. The study recommended that the government implement policies to enhance entrepreneurship development, provide basic infrastructures to enable entrepreneurship, and introduce entrepreneurship education at the post-primary education level. Additionally, the study found that business creation is a propeller and a driving force for economic and social development. Overall, the study highlights the important role of female entrepreneurship in promoting economic and social development and provides valuable recommendations for policymakers and stakeholders to support entrepreneurship in Tunisia.

2.2.2. Ghana case study (2020)

Osei and Zhuang (2020) conducted a study on the relationship between social capital, social innovation, women entrepreneurship, and rural poverty alleviation in Ghana. They analysed data from 333 women entrepreneurs in the Agribusiness sector using structural equation modeling (SEM) and found that women entrepreneurs who utilized social capital from both formal and informal social networks contributed significantly to rural poverty alleviation. The study highlighted the importance of relational social capital, which consists of trust, obligations, and reciprocity, in facilitating the growth performance of women entrepreneurs. Building strong social capital networks helps women entrepreneurs access market opportunities and establish relationships with new partners, customers, and community members, which enhances their entrepreneurship growth performance. The findings suggest that social capital and social innovation indirectly contribute to poverty alleviation through women entrepreneurship, particularly in rural settings in developing countries. The study underscores the need to promote women entrepreneurship growth through social capital and social innovation for rural poverty alleviation.

2.2.3. Pakistan case study (2020)

A study on the emerging trend of women entrepreneurship in Pakistan was carried out by Yaqoob (2020). The study revealed that female entrepreneurial activities have a positive impact on both their social and economic well-being. In addition, it also benefits society by creating wealth and reducing poverty. The study employed the Gioia methodology, interviews have been conducted with selected female informants, Women have shared their own experiences, openly describing their feelings, emotions, and experiences. During the interview, researchers take field notes, which are transcribed immediately after the interview.

The study explores the growth route for women entrepreneurs in Pakistan. The challenges identified included family issues, financial constraints resulting in low profitability, lack of an entrepreneurial attitude, geographical location in an underdeveloped city, and limited use of technology. Support from close relatives and family members was found to act as a motivator for female entrepreneurs (Olufunso, 2010). The study also highlights the fact that in

underdeveloped countries, women typically engage in traditional household crafts as their primary occupation, relying heavily on social networks comprised mainly of their extended family, friends, and neighbours. These informal connections play a vital role in providing crucial resources, including human capital, information, and financial support. The hindrances to the growth of women-owned businesses include financial constraints, family, caste, and cultural issues. However, contrary to necessity-driven entrepreneurship, women in this study were motivated by social capital and identified opportunities in their environment to enter the business. Customer satisfaction was also a top priority for these women who recognized the importance of customization and customer purchasing power. The study highlights the significance of social ties for business growth and profitability and the importance of continuous learning in entrepreneurial success.

2.3. Summary table

Table 1. Summary table of case studies treating Female entrepreneurship and Microenterprise (Allioui & Chafik, 2023)

Research object	Problematic	Methodology	Models	Explanatory Factors
-Title: The Impact of Female Entrepreneurship on Economic Growth in the Asean Countries: A Panel MM-QR Approach -Year: 2023 -Research site: Southeast Asia	How does the significance of female entrepreneurship impact economic growth in Southeast Asian countries, and what is the specific impact of each explanatory variable?	Quantitative research: The study employs empirical panel quantile regression using the Method of Moments Quantile Regression (MM-QR) approach with GDP per employed person.	The study utilizes panel data model with multiple dependent variables. The analysis employs MM-QR approach for panel fixed effects proposed by Machado & Santos Silva (2019) for the period from 1991 to 2021. The model uses seven independent variables to represent female entrepreneurship, along with seven control variables	- Female Entrepreneurship Indicator - Female Pay - Female Parenthood - Gender Development - Foreign direct investment - Gender Inequality - Female Workplace ...
-Title: Has female entrepreneurship been a formidable engine of economic and social development in Tunisia? -Year: 2021 -Research site: Tunisia	To what extent does female entrepreneurship contribute to economic and social development in Tunisia?	Quantitative research: The methodology adopted in this study involves constructing multiple regression models to identify correlations between the dependent and independent variables.	The model's data is limited to the period from 1980 to 2017. The study discusses variables related to economic growth, including the dependent variable: Economic growth rate, and independent variables such as women's entrepreneurship and human capital	- Female entrepreneurship - The human capital - Physical capital -Entrepreneurship - Financial development
-Title: Rural Poverty Alleviation Strategies and Social Capital Link Year: 2020 -Research site: Sekyere South District in Ghana	How can the utilization of social capital by rural women entrepreneurs alleviate rural poverty and potentially transform rural communities?	Quantitative research: The empirical analysis of data from a sample of 333 women entrepreneurs in the Agribusiness sector Ghana involved the application of SEM.	The structural model estimated through PLS bootstrapping indicates that social capital, social innovation, and women entrepreneurship growth have a significant impact on reducing rural poverty.	- Entrepreneurship growth - Poverty alleviation - Relational social capital - Social innovation -structural social capital
-Title: Emerging trend of Women entrepreneurship in Pakistan -Year: 2020 -Research site: lower Punjab of Pakistan	How do women navigate the execution of their entrepreneurial ventures in the face of cultural, social, and economic obstacles?	Qualitative research: The study utilizes the interpretive paradigm and Gioia Methodology proposed by Gioia, and his colleagues (2013	The study discusses the various economic, social, cultural, and technological factors that contribute to the creation of women's entrepreneurial ventures in developing countries such as Pakistan.	- Social and cultural problems -Individual characteristics of entrepreneur -cultural/religious values -strong social capital

3. LEVERAGING THE POWER OF SOCIAL MEDIA FOR WOMEN-LED MICROENTERPRISES IN THE DIGITAL AGE

In today's digital age, social media has become an essential tool for businesses to connect with customers and promote their products or services. For female entrepreneurs, social media offers a cost-effective and powerful way to market their businesses and reach a wider audience. In this section, we will explore the intersection of female entrepreneurship, digital adoption, and social media. We will look at how women-led microenterprises are leveraging the power of social media to grow their businesses and the unique opportunities and challenges they face in doing so.

3.1. Digital technology adoption: social media use by female entrepreneurs

The adoption of digital technologies is defined as 'the business-related use of computer-based solution (Bharadwaj, 2000). The use of technologies such as smartphone apps can provide an enterprise with a range of advantages, including cost savings, increased revenue, a competitive edge, and the potential to create new business models (Bharadwaj, 2000; Yoo et al., 2010; Soluk et al., 2021). Companies can leverage digital technologies to generate firm value and gain a competitive edge (Yoo et al., 2010; Soluk et al., 2021) which can assist them in developing an entrepreneurial approach to their operations(Autio, 2017). Technology adoption can help to reduce the barriers to entry for women entrepreneurs, such as limited access to financial capital (Lee & Rendall, 2001) and decreased levels of human resources, lack of training, and inadequate network connections (Hunter, 2004).

The use of technology is notably high through the medium of social media, Kaplan and Haenlein (2010) defined social media as a set of internet-based applications that utilize the ideological and technological foundations of Web 2.0 and facilitate the creation and sharing of user-generated content. The emergence of social media has fundamentally transformed the way individuals interact with one another.

The COVID-19 pandemic has led to a rapid increase in the use of digital technologies by businesses globally. Women early-stage entrepreneurs in lower-income countries are more likely to report using new technologies as a result of the pandemic than men (39.6% of women vs. 33.9% of men). This represents a 17% higher adoption rate among women compared to men in lower-income countries (GEM, 2022).

One major barrier to technology adoption for female entrepreneurs in microenterprises is a lack of access to technology and digital skills. Many microenterprises in developing countries, where a significant proportion of female entrepreneurs are located, lack the necessary infrastructure and resources (Sharma, 2013) to adopt technology. This includes a lack of access to the internet, computers, and other digital devices, as well as a lack of training in digital skills. Additionally, cultural and societal barriers can limit the participation of women in exploring technologies in their businesses. These barriers can include traditional gender roles that discourage women from pursuing careers in technology, as well as a lack of role models and mentorship opportunities for women in the technology field. Furthermore, societal biases and discrimination can also make it more difficult for women to access the same opportunities and resources as men (Asli, 2018).

3.2. Presentation of case studies

3.2.1. South- eastern Indian case study (2021)

Soluk Kammerlander and Darwin (2021) studied the role digital entrepreneurship in developing countries in empowering microenterprises, the study was both qualitative research about a better understanding of entrepreneurship in developing countries, and a quantitative research by surveyed businesses, which are gained from interviews with some of the owner-managers through Sample and data collection from micro entrepreneurs in the rural and developing areas of the south- eastern Indian state of Andhra Pradesh during 2018 and measurement with the questionnaire. They resulted with the following: the negative effect of business partner support on entrepreneurship to be strengthened when entrepreneurs use digital technologies and that digital technology adoption has a positive moderating effect on the relationship between community and family support and entrepreneurship.

3.2.2. Pakistan case study (2020)

A study on the emerging trend of women entrepreneurship in Pakistan was carried out by Samina Yaqoob (2020). Using the Gioia methodology, the study conducted interviews with a chosen group of female informants who openly shared their personal experiences, feelings, and emotions. Throughout the interview, researchers took field notes which were transcribed promptly afterwards. One of the representatives' quotations regarding Limited Technological advancement was: "*social media can be powerful tool to attract and capture old and new customer. In my case I only used what's app group to advertise my product and this group is only consists of my colleagues, friends, and friends of friends. I also made Facebook page for my product advertisement. Social media can boost your business (Women Entrepreneur)"* (Yaqoob, 2020). The study revealed that social media is a dynamic web composition that facilitates shared, intelligent, and responsive communication, replacing the static websites of the past (Yaqoob, 2020). Entrepreneurs nowadays utilize social media as a powerful tool for business networking, crowdfunding, and acquiring updated information to promote their businesses (Olanrewaju et al., 2020). Stockdale et al. (2012) highlight that social media provides significant business value to entrepreneurs at low cost and with low skills requirements. Social media enables communication across multiple stages or administrations, as members can freely and effectively read, react to, and republish a vast amount of data. Members of social media are information consumers who act as hybrid creators and consumers, repurposing and sharing information in groups in new and innovative ways. Social media also allows for new ways of engagement and communication, such as the use of Creative Commons licensing to bypass established copyright laws (Yaqoob, 2020).

4. FUTURE RESEARCH PERSPECTIVES IN THE MOROCCAN CONTEXT

Following a comprehensive analysis of the case studies, it has become apparent that Morocco, like Pakistan and Tunisia, shares a similar cultural context, thereby providing us with a more extensive comprehension of the difficulties encountered by female entrepreneurs in this region. Our aim is to expound on the potential implications and perspectives for the Moroccan context concerning the subject matter. We sought to experiment with the variables discussed in the previous studies and determine their relevance and applicability in the Moroccan context. Our forthcoming article will aim to explore the impact of social media to empower Moroccan

female entrepreneurs, with the ultimate goal of combating poverty and fostering economic development.

To define the theoretical and empirical framework, we sought to deploy Self-Determination Theory to assist us within the empirical context. SDT holds that "all individuals have natural, intrinsic, and constructive inclinations to build an ever more comprehensive and unified sense of self," (Ryan & Deci, 2002) and people are always trying to satisfy their three essential psychological requirements: autonomy (acting of their own free will), competence (having the expertise and abilities to be successful in their field), and relatedness (feeling of being part of a group and having a connection with others). The reason behind the choice of this theory as a foundation is that SDT can be connected to female entrepreneurship in several ways: **Autonomy**: the need for autonomy is particularly relevant to female entrepreneurship, as many women face cultural and societal barriers that limit their ability to make choices and control their own lives. **Competence**: by developing the skills and abilities needed to run their businesses effectively, female entrepreneurs can increase their sense of competence and feel more capable of achieving their goals. **Relatedness**: by building a network of supportive peers and mentors, female entrepreneurs can increase their sense of relatedness and feel more connected to others in the business community. In the context of Morocco, can these three variables be effectively operationalized and integrated within existing frameworks and systems?

5. CONCLUSION

Entrepreneurship, particularly women's entrepreneurship, plays a crucial role in driving economic growth, wealth generation, and societal progress. The growth and success of economies are closely tied to the development and enhancement of the business environment. In other words, promoting entrepreneurship, and specifically women's entrepreneurship, is essential to achieving prosperity and positive social change.

The case studies have examined the obstacles that impede the progress of businesses owned by women, such as family responsibilities, financial limitations leading to reduced profits, the absence of an entrepreneurial mindset, location in an undeveloped city, insufficient utilization of technology, and gender-based discrimination. The studies have emphasized the significance of developing strong social connections, also known as relational social capital, as it assists women entrepreneurs in accessing market prospects and forming partnerships with new customers, partners, and members of the community. These informal ties have a critical role in providing essential resources, such as human capital, information, and financial assistance.

The studies also suggested measures that can ensure women in developing countries achieve sustainable and fair economic growth while managing their work and family responsibilities. These measures include enacting laws that address family obligations; providing reliable and affordable childcare services; offering education and training opportunities for women entrepreneurs; and eliminating bias and exploitation in the workplace. Women can benefit from access to information and communication technology, digital media, and global connectivity, which can aid their development and facilitate entrepreneurship. Furthermore, establishing a strong social safety net can help mitigate the negative effects of economic downturns on women's employment, particularly in the informal sector.

Women's entrepreneurship is a powerful tool for economic development, as it helps to create jobs, increase productivity, and stimulate innovation. Additionally, it can also help to promote gender equality and empower women in society despite facing numerous challenges. The proliferation of digital technologies through social media has enabled women entrepreneurs

to overcome traditional barriers to entry, the use of digital tools has also allowed women entrepreneurs to access a range of services such as online business training, digital marketing, and remote collaboration. Social media has become a powerful tool for networking and collaboration among women entrepreneurs. Online communities and groups provide a platform for women entrepreneurs to connect, share ideas, and support one another. Numerous interviews featured in the studies have demonstrated how platforms such as Facebook and Instagram have assisted in the growth and expansion of small businesses owned by female entrepreneurs. This support network is particularly important for women entrepreneurs who may face isolation and limited access to traditional business networks.

Women possess the capability and drive to establish, maintain and oversee their own business in an organized manner. With the right support and encouragement from society, family, and government, these women entrepreneurs can become a crucial part of the national economy and make meaningful contributions to economic growth and development (Sharma, 2013).

REFERENCES

Asli, A. N. H. B. (2018). Female Entrepreneurship in Morocco, Obstacles and Ways to Overcome Them. 6th International OFEL Conference on Governance, Management and Entrepreneurship New Business Models and Institutional Entrepreneurs: Leading Disruptive Change - Dubrovnik, 390–391. Retrieved from: http://hdl.handle.net/10419/180004 (Accessed February 9, 2023)

Autio, E. (2017). Digitalisation, Ecosystems, Entrepreneurship and Policy. In Perspectives into Topical Issues Is Society and Ways to Support Political Decision Making. Government's Analysis, Research and Assessment Activities Policy Brief 20/2017 (Issue December), Retrieved from: www.tietokayttoon.fi/en. (Accessed February 20, 2023)

Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: An empirical investigation. MIS Quarterly: Management Information Systems, 24(1), 169–193.

Bruton, G. D., Ahlstrom, D., & Obloj, K. (2008). Entrepreneurship in emerging economies: Where are we today and where should the research go in the future. Entrepreneurship: Theory and Practice, 32(1), 1–14.

Carree, M. A., & Thurik, A. R. (2010). The Impact of Entrepreneurship on Economic Growth. In Handbook of Entrepreneurship Research (pp. 557–594). New York: Springer.

Chikh-Amnache, S., & Mekhzoumi, L. (2023). The Impact of Female Entrepreneurship on Economic Growth in the Asean Countries: A Panel MM-QR Approach. Economics and Business, 37(1), 37–49.

GEM (Global Entrepreneurship Monitor) (2022). Global Entrepreneurship Monitor 2021/22 Women's Entrepreneurship Report: From Crisis to Opportunity. London: GEM, 16-40. Retrieved from: https://www.gemconsortium.org/reports/womens-entrepreneurship (Accessed January 15, 2023)

Herrington, M., Kew, J., & Kew, P. (2010). Tracking Entrepreneurship In South Africa: A Gem Perspective. 13-33. Retrieved from: https://books.google.rs/books/about/Tracking_Entrepreneurship_in_South_Afric.html?id=oCNgewAACAAJ&redir_esc=y (Accessed January 15, 2023).

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. Business Horizons, 53(1), 59–68.

Lee, M. A., & Rendall, M. S. (2001). Self-employment disadvantage in the working lives of blacks and females. Population Research and Policy Review, 20, 291–320.

Olanrewaju, A. S. T., Hossain, M. A., Whiteside, N., & Mercieca, P. (2020). Social media and entrepreneurship research: A literature review. International Journal of Information Management, 50, 90–110.

Olufunso, O. (2010). Graduate Entrepreneurial Intention in South Africa: Motivations and Obstacles. International Journal of Business and Management, 5(9), 87–93.

Osei, C. D., & Zhuang, J. (2020). Rural Poverty Alleviation Strategies and Social Capital Link: The Mediation Role of Women Entrepreneurship and Social Innovation. SAGE Open, 10(2), 3–9.

Ryan, R. M., & Deci Edward L. (2002). Overview of self-determination theory: An organismic-dialectical perspective. In E. L. Deci & R. M. Ryan (Eds.), Handbook of self-determination research (pp. 3–33). University of Rochester Press.

Salim, M., & Anis, J. (2021). Has female entrepreneurship been a formidable engine of economic and social development in Tunisia? Journal of Global Entrepreneurship Research, 11(1), 489–503.

Shah, H., & Saurabh, P. (2015). Women Entrepreneurs in Developing Nations: Growth and Replication Strategies and Their Impact on Poverty Alleviation. Technology Innovation Management Review, 5(8), 5–40.

Sharma, Y. (2013). Women Entrepreneur in India. IOSR Journal of Business and Management (IOSR-JBM), 15(3), 9–14.

Smith-Hunter, A. (2004). Women Entrepreneurship Across Racial Lines: Current Status, Critical Issues, and Future Implications. Journal of Hispanic Higher Education, 3(4), 363–381.

Soluk, J., Kammerlander, N., & Darwin, S. (2021). Digital entrepreneurship in developing countries: The role of institutional voids. Technological Forecasting and Social Change, 170, 120876, 2-10.

Stockdale, R., Ahmed, A., & Scheepers, H. (2012). Identifying Business Value from The Use Of Social Media: An Sme Perspective. Pacific Asia Conference on Information Systems (PACIS) 2012, 7–15. Retrieved from: http://aisel.aisnet.org/pacis2012/169 (Accessed January 15, 2023).

Tsyganova, T., & Shirokova, G. (2010). Gender Differences in Entrepreneurship: Evidence from Gem Data. Organizations and Markets in Emerging Economies, 1(1), 120–136.

Vial, V. (2011). Micro-entrepreneurship in a hostile environment: Evidence from Indonesia. Bulletin of Indonesian Economic Studies, 47(2), 233–262.

Yaqoob, S. (2020). Emerging trend of Women entrepreneurship in Pakistan. Journal of Arts and Social Sciences. VII, 7(2), 217–230.

Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). The new organizing logic of digital innovation: An agenda for information systems research. Information Systems Research, 21(4), 724–735.

Volume XIX, Issue (1) (2023) 252-262

International May Conference on Strategic Management

PERCEIVED USEFULNESS OF CSR: DIFFERENCES AND SIMILARITIES AMONG SMES' ENTREPRENEURS OF EASTERN EUROPEAN NATIONS

Khurram Ajaz Khan, Zdenko Metzker*, Terezie Janikova, John Amoah

Faculty of Management and Economics, Tomas Bata University in Zlin, Czech republic

Abstract: Considering the current sustainable issues, large corporations contribute a lot towards corporate social responsibility. In recent years small-medium enterprises are also willing and implementing CSR practices realizing its importance. In this regard, the present study takes a step further to dig and investigate how the entrepreneurs and managers perceived CSR usefulness specifically in SMEs classified based on demographic factors. The study used 1481 entrepreneurs' feedback from Poland, Slovakia Republic, Hungary, and Ukraine. The study used the Kruskal-Wallis test and multiple populations pairwise comparison to achieve the set objectives. The survey outcomes are at two stages, first based on the demographic classification and second based on the further sub-classification of demographic factors. The finding of the studies exposes a significant difference regarding the perceived usefulness of CSR among entrepreneurs in SMEs in eastern European nations. The outcome of the study is helpful in understanding entrepreneurs' perception of the usefulness of CSR in SMEs as it needs to increase among entrepreneurs. The study adds to the existing literature on CSR in SMEs and gives way forward for future research towards more specific studies on CSR in SMEs' entrepreneurs, specifically in SMEs.

Keywords: CSR, Entrepreneurs, SMEs, Demographic, organizational factors, Eastern European countries

1. INTRODUCTION

The simplest definition of an entrepreneur is a person who sets up a business or business, taking on financial risks in the hope of profit. Relatedly, some additional proposals have been given to include the definition of an entrepreneur, such as innovation, added value, opportunity recognition, use of resources, action, and risk management. Metzker et al. (2021) revealed that there is no accepted definition for Corporate Social Responsibility since CSR is defined based on several factors such as demographic and organizational. Recently, much attention has been to the usefulness of corporate social responsivity by SMEs entrepreneurs (Johnson, 2015; Testa et al., 2015; Lee et al., 2016, Rozsa et al., 2021). However, Choongo, (2017) defines Corporate Social Responsibility as the concept of integrating social and environmental issues, ethical, consumer, and human rights in a firm's operations, interactions with the stakeholders voluntarily.

* *Corresponding author: metzker@utb.cz*

Similarly, the European Commission (2011) defined Corporate Social Responsibility as the extra responsibilities expected from firms or companies for their impact on society. Such responsibilities have made Entrepreneurs inculcate CSR into their business strategies. Notwithstanding, Ezzi et al. (2020) established that SMEs entrepreneurs of Eastern European countries had recognized the differences and similarities of the usefulness of CSR based on demographic and organizational factors which have given rise to positive organizational performance and opportunity for a stronger competitive agenda. Corporate social responsibility (CSR) is an important strategic decision for both SMEs and large firms.

Derevyanko (2019) affirmed that SMEs entrepreneurs have now recognized the usefulness of CSR based on some motivational factors. However, several studies conducted on SMEs entrepreneurs largely focused on relevance or the motivational benefits that the organization would derive from the constant practicing of corporate social responsibility since it has gained attention recently (Belas et al., 2020). Comparatively, small firms do not have extensive resources and have several limitations. Moreover, cut-throat competition, company survival, failure risk, limited and fewer resources, etc., all pose challenges, thereby conflicting the priorities of entrepreneurs (Khan et al., 2019; Belás et al., 2020; Metzker et al., 2021).

Given this, the current studies focus on investigating the differences and similarities in the perceived usefulness of CSR among SMEs in Eastern Europe. This current study's results make the research more relevant by contributing to previous studies conducted on SMEs entrepreneurs and corporate social responsibility, specifically in the Eastern European context. To add more, SMEs entrepreneurs and practitioners would also take inspiration from this current study by developing some comprehensive strategies on how best to consistently inculcate the activities of corporate social responsibilities into their operational agenda based on the differences and similarities of CSR perceived usefulness. In short, the study digs deeply based on the demographic factors, classified into group and sub-group to understand how each group and subgroup perceived CSR usefulness, and the same is the novelty of the present study.

2. LITERATURE REVIEW

Recently, researchers have given much attention to the activities of CSR been undertaken by SMEs entrepreneurs (Kudłak et al., 2018; Metzker & Zvarikova, 2021). There is no definition of CSR since various countries have different scopes. However, Choongo (2017) defines Corporate Social Responsibility as the concept of integrating social and environmental issues, ethical, consumer, and human rights in a firm's operations, interactions with the stakeholders voluntarily. Similarly, the European Commission (2011) defined Corporate Social Responsibility as the extra responsibilities expected from firms or companies for their impact on societies. Such responsibilities have made Entrepreneurs inculcate CSR into their business strategies.

Moreover, Jamali et al. (2017) maintained that the perceived usefulness of CSR has directed the attention of SMEs entrepreneurs from not only profit-making but also to the provision of common social amenities that falls within their domain. They emphasized that large companies previously undertook CSR, but its perceived usefulness and benefits have forced SMEs entrepreneurs within the Eastern Europe to consistently practice is based on demographic and organizational factors. It was revealed that although SMEs entrepreneurs are derived by intrinsic motivation, CSR activities have given them a wider scope of operations. The SMEs entrepreneurs' opinions on CSR have tremendously changed over time since many scholars and researchers have paid much attention to it (Androniceanu, 2019; Rozsa et al., 2021). It is because SMEs entrepreneurs are nowadays found in the scope of engaging in CSR activities, which was initially treated as a less important factor within SMEs' strategic plans due

to its perceived usefulness. Such positive activities have given rise to better connections and opportunities between SMEs entrepreneurs and their customers and societal recognition (Tilt, 2016; Stojanovic et al., 2020).

Small and medium-sized enterprises (SMEs) are highly recognized for their contributions to Eastern European nations as a matter of their positive impact on CSR activities (Gavurova et al., 2020). It is widely accepted that there is no specific definition for SMEs since various countries often use several parameters (Amoah et al., 2021; Vrbka, 2020). It is generally known that SMEs chief executive officers are called founders, owners, entrepreneurs, and managers. Relatedly, Al-Awlaqi et al. (2018) highlighted that SMEs entrepreneurs are accepted to be the heartbeat for national and economic growth. The perceived usefulness of CSR has paved the way for SMEs entrepreneurs in the scope of Eastern Europe to be more innovative and seize opportunities to drive economic change and competitiveness. Metzker et al. (2021) found that SMEs entrepreneurs are job creators, GDP contributors and subsequently create a conducive environment, competitive state of the market for better customer satisfaction.

The perceived usefulness of Corporate Social Responsibility by SMEs in Eastern Europe is often characterized by demographic factors such as nationality (ethnicity), age, qualification, gender, and experience as revealed by Tran and Pham (2020). Bocquet et al. (2019) in their study affirmed that the provision of Corporate Social responsibility activities by SMEs is largely influenced by the nationality of the SMEs entrepreneur. The said publication furthermore revealed that CSR among SMEs entrepreneurs is categorized into five dimensions namely: centrality, proactivity, voluntarism, visibility, and specificity which can influence SMEs performance positively. Moreover, Tran & Pham (2020) established that the nationality or ethnicity of the owner of a particular SME determines its level of corporate social responsibility activities irrespective of the perceived usefulness attached to it. The study finally concluded that SME entrepreneurs consider nationality as a key factor in performing Corporate social responsibility functions in the environment in its operations. According to Saeed and Ziaulhaq (2019), SMEs entrepreneurs are more significant and powerful than large companies since a greater part of strategic decisions has been undertaken only without rigorous consultations compared with large firms or companies where approvals sometimes take a long period.

Also, the gender of SMEs entrepreneurs determines the level of Corporate Social responsibility activities. Several studies have shown or revealed that female entrepreneurs or CEOs significantly increase or attach more relevance to the activities of Corporate social responsibility activities and are more ethical (Kassinis et al., 2016; Tran & Pham, 2020). Again, the theory of gender confirms the assertion of Kanter, (1993). The age of a particular SME entrepreneur determines the level of commitment of CSR issues to be tackled. Furthermore, age as a demographic factor greatly influences the CSR performance by SMEs entrepreneurs (Fabrizi et al., 2014; Shahab et al., 2019) and suggested that young SMEs entrepreneurs are highly able to diagnose information at a shorter period to make decisions as compared with older SMEs entrepreneurs which imbedded into them to continuously practice CSR functions. Oh et al. (2016) established that SMEs entrepreneurs who are near to their retirement age usually show less concern on long-term decisions and disengage from corporate social responsibility activities as in the case of the young entrepreneurs.

A study by Ayuso & Navarrete-Báez (2018) affirmed that experience significantly plays an important role in the CSR issues by SMEs. Entrepreneurs directly manage most SMEs; are closely linked to business partners and the local community; and have limited financial, human, and time resources that may hinder them from implementing similar CSR strategies as larger firms (Lee, 2016).

3. RESEARCH METODOLOGY

Based on the discussed literature review, the following, research question, objectives and hypotheses have been framed:

Research Question: Eastern European nations share similarities in different aspects such as occupational, regional, cultural, etc. Do the entrepreneurs also feel the same about CSR? Is the perceived usefulness of CSR differences among entrepreneurs of SMEs in Poland, Slovakia, Hungary and Ukraine?

Objective:

- To identify the differences in CSR's perceived usefulness among entrepreneurs of SMEs in Poland, Hungary, Slovak Republic, Ukraine, classified based on demographic factors.
- To further divide and compare each classification into subgroups and pairwise to identify their differences and similarities towards the perceived usefulness of CSR.

Hypotheses A

- H1# There is a significant difference in the perceived usefulness of CSR among entrepreneurs based on the sectors of the SMEs.
- H2# There is a significant difference in the perceived usefulness of CSR among entrepreneurs based on nationality.
- H3# There is a significant difference in the perceived usefulness of CSR among entrepreneurs based on gender.
- H4# There is a significant difference in the perceived usefulness of CSR among entrepreneurs based on age.

Hypothesis B

- H1# There is a significant difference in the perceived usefulness of CSR among entrepreneurs of Poland, Hungary, Slovakia, and Ukraine, based on their demographic factors classified into subgroups.

One thousand four hundred eighty-one samples were collected via a comprehensive questionnaire survey from four eastern European nations, covering a wide range of demographic-related factors such as nationality, qualification, gender, age, business entity, related qualifications, etc. Data collection took place from September 2019 to March 2020. The questionnaire survey of small and medium-sized enterprises involved 368 Slovak, 364 Polish, 399 Hungarian, and 350 Ukrainian representatives of managers/owners. The purposive sample was 10 100 SMEs in Slovakia, 7 680 Polish SMEs, 8 750 SMEs in Hungary, and 8 340 Ukrainian SMEs. The average rate of questionnaires return was as followed: Slovakia 5,5%, Poland: 4,7%, Hungary 4,6%, Ukraine 4,2%.

The study followed a quantitative approach to investigate the study's desired objective, i.e., to identify the differences regarding the perceived usefulness of CSR among SMEs entrepreneurs based on their demographic factors in eastern European nations. The survey covered entrepreneurs from a wide geographical range, including Hungary, Slovakia, Poland, and Ukraine. The study intentionally covered SMEs of all sizes, 849 micro, 296 small, and 336 medium, to understand what entrepreneurs of all sizes SMEs perceived CSR usefulness. The study covered micro, small and medium intentionally because so far, the CSR was mainly for the large corporation, and in recent years SMEs are also attracted towards it. But the present study takes it a step further, covering even the micro, small and medium SMEs, and the same adds to the existing literature. The study covered a wide range of segments to include opinions from all the segments and make the sample more generalizable. The sample covered manufacturing, retailing, construction, transportation, agriculture, tourism, and many more (see table 01 Sample profile). Since the study's main objective is to differentiate and detect

similarities about CSR usefulness based on entrepreneurs' demographic features, the present study tried to cover a wide range of demographic factors. The complete sample profile table can be seen in Table 01.

Table 1. Sample Profile (Khan et al., 2023)

Sector	**Classification**	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
	Manufacturing	237	16.0	16.0	16.0
	Retailing	290	19.6	19.6	35.6
	Construction	120	8.1	8.1	43.7
	Transportation	58	3.9	3.9	47.6
	Agriculture	94	6.3	6.3	54.0
	Tourism	45	3.0	3.0	57.0
	Services	539	36.4	36.4	93.4
	Any other	98	6.6	6.6	100.0
	Total	1481	100.0	100.0	
Nationality	**Classification**	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
	HU	399	26.9	26.9	26.9
	PL	364	24.6	24.6	51.5
	SR	368	24.8	24.8	76.4
	UA	350	23.6	23.6	100.0
	Total	1481	100.0	100.0	
Gender	**Classification**	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
	Man	910	61.4	61.4	61.4
	Women	571	38.6	38.6	100.0
	Total	1481	100.0	100.0	
Age	**Classification**	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
	Less than 35 years	391	26.4	26.4	26.4
	From 36 to 45 year	485	32.7	32.7	59.1
	From 46 to 55 years	409	27.6	27.6	86.8
	More than 56 years	196	13.2	13.2	100.0
	Total	1481	100.0	100.0	

To investigate the perceived usefulness of CSR among entrepreneurs. Four items were used to understand the entrepreneurs' perception (See Table 02). The questionnaire had a five-point Likert scale, asking their level of agreement (1 = Strongly agree; 5 = Strongly disagree. The present study used SPSS 23 for the quantitative analysis. The self-reported statements were used in several existing studies (Çera et al., 2020; Rozsa et al., 2021).

Table 2. Descriptive Statistics and Measurement scale (Khan et al., 2023)

Code	Items	N	Mini	Maxi	Mean	Std. Devi
CSR1	I know the concept of corporate social responsibility (CSR) and assert it in the business.	1481	1.0	5.0	2.231	1.0638
CSR2	Implementation of CSR enables our company to gain a competitive advantage in the market and higher customer loyalty.	1481	1.0	5.0	2.431	1.0575
CSR3	CSR enables our company to gain reputation and new business opportunities.	1481	1.0	5.0	2.427	1.0630
CSR4	CSR enables our company to attract satisfied, loyal and motivated employees.	1481	1.0	5.0	2.406	1.0651

Initially, basic data checking revealed a satisfactory Cronbach alpha .893 (see Table 03). Then the data normality was checked. To check whether the data is normally distributed or not, Kolmogorov-Smirnov and Shapiro-wilk test of normality was tested and found the data was not normally distributed. Since the data were not normally distributed, satisfying the assumption of

the Kruskal-Wallis test. Therefore, the present study applied the Kruskal-Wallis test. Furthermore, based on the Kruskal-Wallis test, the results were further compared pairwise to answer the study's second objective.

Table 3. Reliability test (Khan et al., 2023)

Cases	Case Processed	Cronbach's Alpha	N of Items
1481	100%	.893	4

Table 4. Tests of Normality – Lilliefors Significance Correction (Khan et al., 2023)

Items	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CSR1	.226	1481	.000	.865	1481	.000
CSR2	.185	1481	.000	.891	1481	.000
CSR3	.200	1481	.000	.892	1481	.000
CSR4	.199	1481	.000	.890	1481	.000

4. RESULT ANALYSIS

This section discussed each set hypothesis and found whether there are significant differences or not (see table 5). The hypothesis H1# investigates a significant difference in the perceived usefulness of CSR among entrepreneurs based on the sectors of the SMEs. The analysis reveals (Chi-Square 14.649, df-07, P-value-.041) a significant difference among entrepreneurs of different sectors such as manufacturing, retailing, services, etc. The second hypothesis, H2#, was also found significant that there is a significant difference in the perceived usefulness of CSR among entrepreneurs based on nationality (Chi-Square 216.886, df-03, P-value-.000). Entrepreneurs from Hungary, Poland, Slovakia, and Ukraine have different perceived usefulness of CSR. Therefore, it confirms that entrepreneurs from different nationalities have different perceived usefulness of CSR in the SMEs segment. H3# that there is a significant difference in the perceived usefulness of CSR among entrepreneurs based on gender. The test supports the existing studies that gender is a significant factor (Chi-Square 43.516, df-01, P-value-.000). Male and female entrepreneurs have different perceived usefulness levels of CSR in Poland, Slovakia, Hungary, and Ukraine. The hypothesis H4# There is a significant difference in the perceived usefulness of CSR among entrepreneurs based on age, and it was found significant (Chi-Square 12.405, df-03, P-value-.006). Therefore, the study can claim that entrepreneurs of different age levels have different perceived usefulness levels, which again attracts further investigation. But the, age is a significant factor, young entrepreneurs might have more concern about profitability, and they might perceive less usefulness of CSR. All these need further examination.

Table 5. Results: Differences based on demographic features (Khan et al., 2023)

	Chi-Square	df	P value	Significant
Sector	14.649	7	.041	Significant
Nationality	216.886	3	.000	Significant
Gender	43.516	1	.000	Significant
Age	12.405	3	.006	Significant

The study further investigated the significant factors, which reveals a significant difference. To further understand the differences, the study further compares the groups classified under each demographic element, pairwise comparison. The objective is to find which categories under each group are significantly different. The gender was classified into male and

female, so there is no further multigroup comparison. Those categories, which were found significant, also conducted multiple group comparisons. To understand the similarities and differences from a close angle regarding the perceived usefulness of CSR among entrepreneurs in Poland, Hungary, Slovakia, and Ukraine (see Table-6).

Table 6. Pairwise Comparison-Multiple comparison (Khan et al., 2023)

Demographic factors	**Pairwise**	**P-value**	**Outcome**
Sector	Retailing-transportation	.541	Insignificant
	Retailing- agriculture	.175	Insignificant
	Retailing-services	.012	Significant
	Retailing-manufacturing	.011	Significant
	Retailing-construction	.012	Significant
	Retailing-tourism	.037	Significant
	Retailing-other form	.004	Significant
	Transportation-agriculture	.662	Insignificant
	Transportation-services	.494	Insignificant
	Transportation-manufacturing	.359	Insignificant
	Transportation-construction	.251	Insignificant
	Transportation-tourism	.215	Insignificant
	Transportation-other form	.135	Insignificant
	Agriculture-services	.847	Insignificant
	Agriculture-manufacturing	.615	Insignificant
	Agriculture-construction	.421	Insignificant
	Agriculture-tourism	.340	Insignificant
	Agriculture-any other	.226	Insignificant
	Services-manufacturing	.610	Insignificant
	Services-construction	.377	Insignificant
	Services-tourism	.239	Insignificant
	Services-other form	.163	Insignificant
	Manufacturing-construction	.659	Insignificant
	Manufacturing-tourism	.492	Insignificant
	Manufacturing-other form	.344	Insignificant
	Construction-tourism	.721	Insignificant
	Construction-other form	.638	Insignificant
	Tourism-other form	.992	Insignificant
Nationality	Ukraine-Hungary	.000	Significant
	Ukraine- Slovakia	.000	Significant
	Ukraine-Poland	.000	Significant
	Hungary-Slovakia	.005	Significant
	Hungary-Poland	.002	Significant
	Slovakia-Poland	.783	Insignificant
Age	Less than 35 years- from 36 to 45 years	.038	Significant
	Less than 35 years- from 46 to 55 years	.004	Significant
	Less than 35 years- more than 56 years	.002	Significant
	From 36 to 45 years- from 46 to 55 years	.358	Insignificant
	From 36 to 45 years- more than 56 years	.136	Insignificant
	From 46 to 55 years-more than 56 years	.457	Insignificant

The multiple population comparisons reveal further which groups are exactly different or similar from each other. The groups who have significant differences are in one category and have differences, and the groups that have insignificant have no difference and have similarities among them regarding the perceived usefulness of CSR. The groups under the following category, i.e., sector, found a significant difference between retailing-services, retailing-

manufacturing, retailing-construction, retailing-tourism, and retailing-other form and rest of the groups were found insignificant differences reflect similarities regarding perceived usefulness of CSR. Similarly, significant differences were detected between all countries except between Slovakia and Poland based on nationalities. In short, the comparison between nations was significant. It reflects more differences than similarities among entrepreneurs in eastern European countries. Furthermore, the group formed based on age found significant differences between the following groups Less than 35 years- from 36 to 45 years, Less than 35 years- from 46 to 55 years and Less than 35 years- more than 56 years and similarities between from 36 to 45 years- from 46 to 55 years, From 36 to 45 years- more than 56 years and from 46 to 55 years- more than 56 years. The analysis's overall objective is to identify further the differences and similarities between sub-groups formed from each category created based on the demographic factors. To have a more comprehensive and closer picture of the perceived usefulness of CSR among entrepreneurs in Poland, Hungary, Slovakia, and Ukraine, the present analysis offers some meaningful results for future use.

5. DISCUSSION

In the sector comparison, we noted that the perception of CSR issues is different when comparing retailing. It is common knowledge that retailers deliver goods to the final consumer. In most cases, it is not its producer. On the other hand, service production, manufacturing, construction, tourism or other forms of business have a greater impact on society, the community or the environment. (Habek, 2017; Kumar et al., 2021; Uslu et al., 2020) and therefore increase involvement in CSR activities is expected from them. Not so in terms of the relationship with employees, but in the aspects of sustainable production, environmental protection, sustainable tourism, etc. (Carroll, 2016; Lu et al., 2020). The authors found that when examining the attitudes of individual countries, there are statistically significant differences in CSR perception. We can generalize that in addition to comparing Poland and Slovakia, countries differ significantly in their attitudes to CSR. This is due to several reasons. One of them is the lack of information in the countries (Rozsa et al., 2021), different impact of the macro-environment (political, tax measures of specific governments) (Lu et al., 2020), but the biggest is probably ignorance of the concept of CSR - companies try to behave responsibly, but managers do not know that this is CSR (Nagypal, 2014; Belas et al., 2021; Metzker & Zvarikova, 2021). Also, when looking at the issue in terms of the age of the respondent, we see statistically significant differences in the case of managers under the age of 35 compared to others. This phenomenon may be positively influenced by younger attitudes towards sustainability and business ethics (Boulouta & Pitelis, 2014; Adda et al., 2016).

6. CONCLUSION

In the article, the perception of the concept of corporate social responsibility by managers of small and medium-sized enterprises was examined. The research team looked for aspects that can determine the perception of CSR. We found that retail has a significantly different perception of CSR compared to other industries. This is mainly due to the very nature of retail - not to produce, but to sell to the final consumer. Similarly, significant differences were found between all countries except Slovakia and Poland based on nationalities. At the same time, the group created on the respondent's age basis showed significant differences between the following groups under the age of 35 and older managers.

Of course, this study has its limits. The first limit is a comparison of 4 claims, where we did not distinguish how (whether positive or negative) this statistical significance of the claims

to CSR is recorded. Another important limiting item is the examination of only selected Eastern European countries. Despite these limitations, this study can be seen as a starting point for future comprehensive research on a larger sample. Future comparisons between companies could point to better knowledge. The results of the article may be of interest to organizations that focus on supporting or implementing CSR in the countries studied.

ACKNOWLEDGEMENT

This paper is supported by IGA/FaME/2023/014: "CSR as an important factor in obtaining bank loans and external financial resources for small and medium-sized enterprises."

REFERENCES

Adda, G., Bosco Azigwe, J., & Awuni, A. R. (2016). Business ethics and corporate social responsibility for business success and growth. European Journal of Business and Innovation Research, 4(6), 26–42.

Al-Awlaqi, M. A., Aamer, A. M., & Habtoor, N. (2018). The effect of entrepreneurship training on entrepreneurial orientation: Evidence from a regression discontinuity design on micro-sized businesses. The International Journal of Management Education, 19(1), 100267.

Amoah, J., Jibril, A.B., Luki, B.N., Odei, M.A., & Yawson, C. (2021). Barriers of SMEs' sustainability in sub-saharan Africa: a pls-sem approach. International Journal of Entrepreneurial Knowledge, 9(1), 10-24.

Androniceanu, A., Gherghina, R., & Ciobanasu, M. (2019). The interdependence between Fiscal Public Policies and Tax Evasion. Administratie si Management Public, 32, 32-41.

Ayuso, S., & Navarrete-Báez, F. E. (2018). How Does Entrepreneurial and International Orientation Influence SMEs' Commitment to Sustainable Development? Empirical Evidence from Spain and Mexico. Corporate Social Responsibility and Environmental Management, 25(1), 80–94.

Belas, J., Amoah, J., Petráková, Z., Kliuchnikava, Y., & Bilan, Y. (2020). Selected Factors of SMEs Management in the Service Sector. Journal of Tourism and Services, 11(21), 129–146.

Belas, J., Çera, G., Dvorský, J., & Čepel, M. (2021). Corporate social responsibility and sustainability issues of small- and medium-sized enterprises. Corporate Social Responsibility and Environmental Management, 28(2), 721–730.

Belás, J., Khan, K. A., Maroušek, J., & Rozsa, Z. (2020). Perceptions of the importance of business ethics in SMEs: A comparative study of Czech and Slovak entrepreneurs. Ethics & Bioethics, 10(1–2), 96–106.

Bocquet, R., Le Bas, C., Mothe, C., & Poussing, N. (2019). Strategic CSR for innovation in SMEs: Does diversity matter? Long Range Planning, 52(6), 101913.

Boulouta, I., & Pitelis, C. N. (2014). Who Needs CSR? The Impact of Corporate Social Responsibility on National Competitiveness. Journal of Business Ethics, 119(3), 349–364.

Carroll, A. B. (2016). Carroll's pyramid of CSR: taking another look. International Journal of Corporate Social Responsibility, 1(1), 1–8.

Çera, G., Belas, J., Marousek, J., & Çera, E. (2020). Do size and age of small and medium-sized enterprises matter in corporate social responsibility? Economics and Sociology, 13(2), 86–99.

Choongo, P. (2017). A longitudinal study of the impact of corporate social responsibility on firm performance in SMEs in Zambia. Sustainability, 9(8), 1300.

Derevianko, O. (2019). Reputation stability vs anti-crisis sustainability: under what circumstances will innovations, media activities and CSR be in higher demand?. Oeconomia Copernicana, 10(3), 511–536.

Ezzi, F. (2020). CSR categories and R & D investment : the moderating role of Managerial emotional intelligence, 15, 17-37.

Fabrizi, M., Mallin, C., & Michelon, G. (2014). The Role of CEO's Personal Incentives in Driving Corporate Social Responsibility. Journal of Business Ethics, 124(2), 311–326.

Gavurova, B., Cepel,M., Belas, J. & Dvorsky, J.(2020).Strategic Management in SMEs and Its Significance for Enhancing the Competitiveness in the V4 Countries - A Comparative Analysis. Management & Marketing, 15(4) 557-569.

Habek, P. (2017). CSR Reporting Practices in Visegrad Group Countries and the Quality of Disclosure. Sustainability 2017, 9(12), 2322.

Johnson, M.P. (2015). Sustainability Management and Small and Medium-Sized Enterprises: Managers' Awareness and Implementation of Innovative Tools. Corporate Social Responsibility and Environmental Management, 22(5), 271-285.

Jamali, D., Lund-Thomsen, P., & Jeppesen, S. (2017). SMEs and CSR in Developing Countries. Business and Society, 56(1), 11–22.

Kanter, R. (1993) Men and Women of the Corporation. 2nd Edition, Basic Book, New York.

Kassinis, G., Panayiotou, A., Dimou, A., & Katsifaraki, G. (2016). Gender and Environmental Sustainability: A Longitudinal Analysis. Corporate Social Responsibility and Environmental Management, 23(6), 399–412.

Khan, K. A., Çera, G., & Netek, V. (2019). Perception of the Selected Business Environment Aspects by Service Firms. Journal of Tourism and Services, 10(19), 111–127.

Kumar, K., Batra, R., & Boesso, G. (2021). Difference in stakeholder engagement approach of small & medium enterprises and large companies and its performance implications. Corporate Social Responsibility and Environmental Management, 28(3), 992–1001.

Lee, S. Y. (2016). How can companies succeed in forming CSR reputation? Corporate Communications, 21(4), 435–449.

Lu, J., Ren, L., Zhang, C., Wang, C., Shahid, Z., & Streimikis, J. (2020). The influence of a firm's csr initiatives on brand loyalty and brand image. Journal of Comptetitivness, 12 (2), 106-124.

Metzker, Z., Maroušek, J., Hlawiczka, R., Belás, J., & Khan, K. A. (2021). The Perception of the Market and Operational Area of Business by Service Sector and Tourism Companies in terms of CSR implementation. Journal of Tourism and Services, 12(23), 217–236.

Metzker, Z., & Zvarikova, K. (2021). The perception of company employees by SMEs with CSR concept implementation. International Journal of Entrepreneurial Knowledge, 9(1), 81–96.

Metzker, Z., Belas, J., & Amoah, J. (2021). The perception of using social media-A comparison of entrepreneurs implementing CSR in managerial practice and other entrepreneurs in selected V4 countries. Marketing and management of innovations, 2, 191-203.

Metzker, Z., & Streimikis, J. (2020). CSR activities in the Czech SME segment. International Journal of Entrepreneurial Knowledge, 8 (1), 49-64.

Nagypal, C. N. (2014). Corporate social responsibility of Hungarian SMEs with good environmental practices. Journal of East European Management Studies, 19(3), 327–347.

Oh, W. Y., Chang, Y. K., & Cheng, Z. (2016). When CEO career horizon problems matter for corporate social Responsibility: The moderating roles of industry-level discretion and block holder ownership. Journal of Business Ethics, 133(2), 279-291.

Rozsa, Z., Belas, J., Khan, K. A., & Zvarikova, K. (2021). Corporate social responsibility and essential factors of personnel risk management in smes. Polish Journal of Management Studies, 23(2), 449–463.

Saeed, A., & Ziaulhaq, H. M. (2018). The impact of CEO characteristics on the internationalization of SMEs: Evidence from the UK. Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de administration, 36(3), 322-335.

Saeed, A., & Ziaulhaq, H. M. (2019). The Impact of CEO Characteristics on the Internationalization of SMEs: Evidence from the UK. Canadian Journal of Administrative Sciences / Revue Canadienne Des Sciences de l'Administration, 36(3), 322–335.

Shahab, Y., Ntim, C. G., Chen, Y., Ullah, F., Li, H.-X., & Ye, Z. (2019). CEO Attributes, Sustainable Performance, Environmental Performance, and Environmental Reporting: New Insights from Upper Echelons Perspective. SSRN Electronic Journal.

Shahab, Y., Ntim, C. G., Chen, Y., Ullah, F., Li, H. X., & Ye, Z. (2020). Chief executive officer attributes, sustainable performance, environmental performance, and environmental reporting: New insights from upper echelons perspective. Business Strategy and the Environment, 29(1), 1-16.

Stojanovic, A., Milosevic, I., Arsic, S., Urosevic, S. & Mihajlovic, I., (2020). Corporate Social Responsibility as a Determinant of Employee Loyalty and Business Performance. Journal of Competitiveness, 12(2), 149–166.

Testa F., Gusmerottia N. M, Corsini F, Passetti E. & Iraldo F. (2016). Factors affecting environmental management by small and micro firms: The importance of entrepreneurs' attitudes and environmental investment. Corporate Social Responsibility and Environmental Management, 23(6), 373-385.

Tilt, C. A. (2016). Corporate social responsibility research: the importance of context. International Journal of Corporate Social Responsibility, 1(1), 1–9.

Tran, N. M., & Pham, B.-N. T. (2020). The influence of CEO characteristics on corporate environmental performance of SMEs: Evi-dence from Vietnamese SMEs. Management Science Letters, 10(8), 1671-1682.

Uslu, A., Alagöz, G., & Güneş, E. (2020). Socio-cultural, Economic, and Environmental Effects of Tourism from the Point of View of the Local Community. Journal of Tourism and Services, 11(21), 1–21.

Vrbka, J. (2020). The use of neural networks to determine value-based drivers for SMEs operating in the rural areas of the Czech Republic. Oeconomia Copernicana, 11(2), 325–346.

Volume XIX, Issue (1) (2023) 263-272

International May Conference on Strategic Management

BELIEF AND COMMITMENT TO WORK: A PRINCIPLE OF SUSTAINABLE DEVELOPMENT IN HEALTH AND OCCUPATIONAL SAFETY

Nettour Djamel[1*], Amrani Mourad[2], Chaib Rachid[3], Bensehamdi Salim[1],

[1]*Mining Engineering Department, Higher National School of Mining and Metallurgy Amar Laskri, 23005 Annaba, Algeria*
[2]Université Hadj Lakdar, Batna, Algeria,
[3]*Transportation Engineering Department, Laboratory of Transports and Environment Engineering, Mentouri Brothers University Constantine1, Algeria*

Abstract: Sustainable development is the focus of all reflections. This is why companies must change their management methods. Thus, no one will have to lose his life trying to earn it. This work aimed to prevent and reduce the production the dangers, to ensure that the management is without endangering or altering human health and without harming the environment. Our approach is based on the ethical responsibility said: "Allah loves, when a person does something, that he masters it". However, without a permanent feeling of belonging to a work culture based on values, principles of action and ethical and deontological behavior, the goal is never accomplished. This impartiality can be achieved by the existence within each company of a policy geared towards sustainable prevention based on the beliefs, values and principles of action, the objective of our research. Henceforth, the ethical responsibility is a principle of sustainable development. Thus, succeeding to propose a principle of sustainable development in health and safety at work in the company would be a feat for the employee, the company, or even society. The experience shows that setting up a company health and safety management system is the best ways to ensure risk management, environmental.

Keywords: Management, belief, improvement, safety, health, prevention measures

1. INTRODUCTION

In principle, compliance with legislation, standards and recommendations in force in health and work safety should guarantee appropriate hygiene conditions and occupational safety. Unfortunately, today in practice, this is not the case and the situation is significantly more complex. On one hand, technical progress and intense competitive pressures lead to rapid changes in working conditions and processes as well as of organization and the pressure is made stronger on professional management of human resources, even the employee (Diane & David, 1996; Gilbert & Charpentier, 2004).

On the other hand, in the minds of some entrepreneurs, it is often preconceived ideas about safety and health at work leading to regulatory constraints and additional costs, not

[*] *Corresponding author: djamel.nettour@ensmm-annaba.dz*

generating any profit. This involuntary reaction, not innate, is just the result of a custom that evolves over time towards a behavioral reflex neglecting health and occupational safety. Otherwise, it becomes very difficult ensuring a balance between the real risks and preventative measures adopted (Abdi et al., 2020). Except, legislation is essential but not sufficient to cope with these changes or stay abreast of new risks (Kharzi et al., 2020). Therefore, the company must constantly adapt to changes in its environment, react effectively in dynamic risk management strategies (AFSSA, 2008) and the man who is part, should naturally evolve at its own pace and be in harmony with this management. Subsequently, feel good at work is a strategic issue for all company partners. Immediately, globalization, intensifying competition in international markets, companies and management faculties interested more in "winning patterns" of organization and new competitive advantages that could help forestall their competitors (Richer, 2013). This forces the company to think differently: the economic growth is based on entrepreneurship (ONUDI, 2021). Indeed, the notion of performance refers to the growth of ideas, profitability, profit, in which the individual is a stakeholder as well as economy and technology. However, its ability to meet the needs of competitiveness, to innovate, to be dynamic and reactive, brief to be effective depends largely on initiatives that will take or not the employees and even the safety prevailing culture in the company. Henceforth, this culture is represented by the set of values, beliefs, attitudes and behaviors, as well as the rituals integrated into all levels of the organization, which determine the way all personnel think and act in relation to the security (SNES, 2006; ASSTSAS, 2016; Anglogold, 2021). Thus we see that awareness of the risks transformed into an act of worship is to advance knowledge of people and affect how they react now think, objective of our work. In addition, work attachment transforms the collective work in a community and the devotion which then manifest them are source of performance for the group (Jacquinot & Tanon, 2009; Scrima, 2014). We see belief as inspiration and as a catalyst for change behavior. Therefore, the debate on the attachment is believed that is virtuous and positive transformation vector. To the debate alone that is in a position to giving back its place and activates its positive potential with different players: having the feeling of religious obligations. There are no accidents without causes; the fatality and chance are often mentioned by someone. Unfortunately, these elements do not actually have influence only on the consequences of the accident and they should not be taken as determinants of it (Kharzi et al., 2020). It is necessary starting from the man in relation to what he himself believes to be the Absolute (Debray, 1941).

So arriving at propose a principle of sustainable development in health and safety at work based belief: "*Allah loves when someone makes something, he does it with care*" (Messenger of Allah Mohamed a). Any serious work taking place in dignity, love and zeal, could only build and strengthen the greatness of the one who realizes it. This principle allows to prevent and reduce the production of harmful dangers, to manage risk, ensuring that management is done without endangering nor impair human health and without harming the environment, in particular without risk to the ecosystem, the fauna and flora, without causing noise or odors, while providing public information on the effects to the environment and public health of production operations and hazard management.

2. IMPORTANCE OF SAFETY IN A COMPANY

Accidents at work (AT) and occupational diseases (PD) have enormous human and economic consequences. This is why any company has an interest in ensuring the health and safety of its personnel while keeping as the main reality that man is one of the major players in the generation of value for the company: the question of his performance remains a

challenge for the organization. Thus, commitment to work is the source of performance gains and innovation. From now on, the overall level of staff health has a significant influence on the smooth running of the company. The cost of accidents at work and occupational diseases are now forcing local authorities to integrate risk prevention and the improvement of working conditions as a performance factor in human resource management systems. While workplace accidents have a cost, their prevention is an investment. (Damas, 2005; Amrani, et al. 2020). A healthy person is: Less absenteeism; Less organizational problems to replace the missing persons; Better working environment; A better motivation resulting in better productivity; A good company image; Less risk of accidents due to lack of staff or stress.

Therefore, prevention of occupational risks and improving working conditions are participating in the valorization of trades, maintaining of quality employment, increases social welfare and improves the economic performance of the company in a lifetime quality at work. Therefore, now the prevention not only aims to reduce the number of occupational injuries, but also to eliminate or at least reduce all professional risks (Dufour & Pouillot 2002). It has been convinced that the "***zero risk***" is not only possible but that it is a necessity that imposes a permanent and sustainable risk prevention.

This prevention enables the company managers, employees and their representatives to (Aouati et al., 2017):

- To achieve better control of occupational hazards;
- To respect the physical integrity of each through a good evaluation and implementation of preventive measures, taking into account the organization of work and its human and technical components;
- To assist compliance with the current legislation;
- Improving the working conditions and welfare of employees;
- Engaging in a process of continuous improvement in health and work safety;
- And more generally, improving the working conditions of a continuous and sustainable manner and thus develop sustainable prevention culture within the entity.

3. WHY A STRATEGY OF RISK MANAGEMENT?

In 1972, the United Nations Conference on environment adopted a set of principles for environmentally sound management of the environment. This "Stockholm Declaration" has listed international concerns pointing to economic growth, pollution of the global commons (air, water, oceans) and the well-being of people in the world. Therefore, it is now clear that a risk management strategy is a key issue for economic growth, development of the wealth of nations in all sectors of activity and well-being of employees. Insurance and management of these risks are key elements of the new sustainable service economy. The efficiency of sustainable development in occupational safety and health is dependent on a thorough and comprehensive understanding of the characteristics of activity to which our societies are facing. Consequently, whatever the activity and size of the organization, the risk must be taken in the heart of the daily management of any company**.** In the absence of effective management of activities and work processes (Auduberteau & Ganino, 2003), it is the entire enterprise that is mismanaged: *the health of the company is the corporate health* (Abdi et al., 2020). So be surrounded by clutter and disorganization is a source of inefficiency, waste of time, distraction or even frustration. A quarter of deaths worldwide is attributable to an unhealthy environment (Soline, 2016). Thus, the development of a prevention policy is not the task of a one person. It is only when everyone at its own level and from its function and its possibilities brings his stone to the building of the policy of prevention that can register a

result, prevent damage to people, property and the environment, with the slogan win-win, see figure 1.

This active and proactive approach facilitates the access to employment, promoting the welfare of employees, improving business performance and protects the environment. It is a set of early actions, designed to control risks and improve working conditions through technical solutions, organizational and human based on the beliefs and values. The observation of the ground and experience feedback often provide important information to implement some necessary improvements (Bertrand, 2006; Aouati, et al. 2017; Salmi & Chaib, 2017; Abdi et al., 2020).

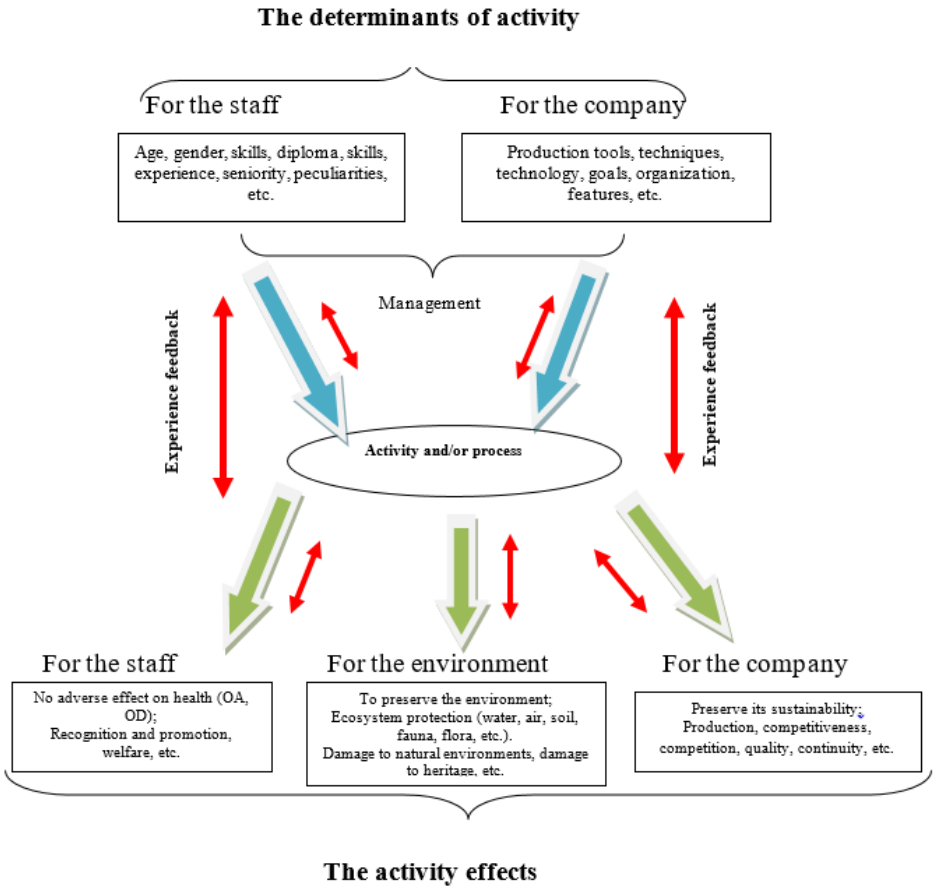


Figure 1. Principle of sustainable development in health and occupational safety (Chaib & Benidir 2016)

3.1. The stakes of the approach

As culture is a regulatory mechanism that draws the demarcation between what is admitted and what is not, what is right and what is wrong, according to defined and agreed values. Thus, the solutions are elaborated from the spheres of sustainable development, namely the belief spheres, ethical, social, economic and environmental, as "*the environment is a set of media influences (human environments, natural, economic) acting on the individual at every moment of its daily life and largely determine its behavior in all dimensions of being: social, intellectual, emotional, spiritual, and cultural*" (http://www.cons-dev.org).

Subsequently, the implementation of this active approach of prevention must meet these different challenges:

- A human issue that should be at the heart of the change process,- often ignored- maintaining the safety and physical and mental health of employees;
- A legal stake: meeting regulatory requirements, civil or criminal liability of the community and / or its agents may be engaged in a workplace accident;
- An economic stake: reduce direct costs: (repairs, health care, etc.) and indirect costs of workplace accidents (replacement of the victim, overwork presents, declining quality of service to the public), sustain the company, etc.
- A management stake: motivating, recognize and empower agents, creating a climate of trust within the community;
- An environmental stake: Preserving the environment and protect the ecosystem (water, air, soil, fauna, flora, etc.), etc.

An ethics stake (Anglogold, 2001; SNES, 2006; Messenger of Allah Mohamed a; Patric et al., 2012): Everyone is a winner, the use, the employer and all mankind (the environment in the broadest sense).

3.2. Apply the general principles of sustainable prevention

Every serious work-taking place in dignity, love and zeal, could only build and strengthen the greatness of the one who realizes it. These skills have gradually become critical determinants of economic competitiveness and growth. Now, the quality of work life is our best competitive advantage (Abdi et al., 2020).

Thus, managers must implement preventive measures based on the general principles of prevention based on the beliefs, attitudes and values to arrive at building a culture of health and safety, sustainable work (Dossier, 2006, Patric et al., 2012), having the main objective the establishment of a sustainable safety culture in company, see Figure 2 .

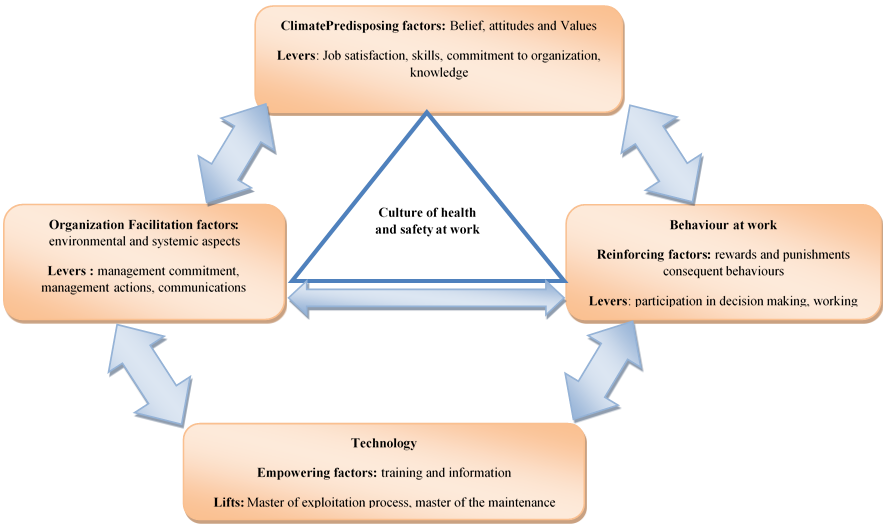


Figure 2. Principle of a sustainable culture in health and occupational safety

3.3. The action program "HOTD"

After assessing the risks, became aware of the regulations and standards. It becomes necessary that those responsible for all activities concerned exchange the necessary information for the safety and conduct of the proposed operation and deciding together the measures to be implemented to prevent risks (training and additional information from stakeholders, planning and possible coordination of interventions, used as means, etc.). Subsequently, optimizing the operation of the organization through accurate knowledge of the activity: its determinants and effects. This knowledge of the real work can identify defects in the organization (how the unforeseen are managed, etc.) and the needs of different workstations (hardware adaptation, adaptation of the organization or skills, etc.).

The next step is to implement a program of actions: setting tables summarizing the actions to be implemented, those responsible for their accomplishments, deadlines and means necessary. The actions to be taken are four types (Dangers, 2008; Taleb, et al. 2022):

Organisational

- Implement procedures for the dissemination of relevant information on occupational safety (e.g. rules, particular instructions at the workplace);
- Redefine if necessary tasks and work organization;
- Assigning human resources, corresponding technical and financial, etc.

Human

- Extend the competences of officers in terms of hygiene and safety at work through the initial and continuing training. Training actions reinforce professionalism;
- Communicating in the field of health and occupational safety for involving the staff: awareness, poster campaign;
- Establish a participatory approach, etc.

Technical

- Integrating safety officers from the design of a building or workplace (ventilation, lighting, sound insulation, access, circulation, releases, etc.);
- To comply machines with regulatory and technical requirements (protection of moving parts of work, protection against flying and falling objects and elements, emergency stop devices, etc.);
- Carry out the maintenance and periodic checks of equipment;
- Controlling risks by implementing collective or individual protection ;
- Studying an ergonomic layout;
- Use of work equipment adapted to the activity (e.g. handling carriage) ;
- Providing work clothing to staff a protective equipment appropriate to the activity.

Deontological

This is a key element of developing good governance company. Our behaviors and actions must be structured in phase with the values of our society to serve as source of inspiration for the steering, internally, our actions and our decisions, and our interaction with external stakeholders of our work and the public « *the good behavior* is the best thing that has been given to people » (Messenger of Allah Mohamed b.).

- The morality to remember is that companies, whatever their size, have economic interest in investing in the quality of life, safety and occupational health;
- The employee motivation, which develops a sense of belonging to a family whose « father » is concerned about their health and safety. They will speak of « their » company and « their » boss. It is all benefits! (Colin, 2002);
- Developing its permanently working culture based on values, principle of action and ethical and deontological behavior (Colin, 2002; Philippe & Tanon, 2009);

Finally, arriving at building stone by stone, in the common interest of all parties concerned employee, employer and society.

3.4. Search of safety measures

Based on the general principles of prevention, our attachment to work and action program established, a hierarchy of safety measures can be established, classifying them into five categories, figure 3, with the base slogan: « *The good behavior is the best thing that has been given to people* » (Messenger of Allah Mohamed, c). Now, the Occupational Safety and Health constitute a central issue for all humanity "After faith, no one has ever received a better grace than health" (Messanger of Allah), by the International Labor Organization (ILO), (Bossard, 2005; BIT 2004).

1. ***Intrinsic prevention measures***: Measures that consist in avoiding or reducing as many hazards as possible by properly selecting some design features and limiting human exposure to hazardous inevitable phenomena that can't be sufficiently reduced; This can be achieved by reducing the need for the operator to intervene in dangerous areas.

2. ***Awareness measures*****:** The number of OA and OD could be significantly reduced if each person had minimal knowledge of risks and simple measures of prevention and protection to implement, knew how alerting the appropriate emergency service and make the first indispensable steps in pending its arrival. Such an attitude implies the awareness of the role that each one can be able to play to support the safety, his health and provide support to preserve those of others. Henceforth, it is necessary to develop preventive information.

	Intrinsic prevention Elimination/reduction	Sensitization		Protection Collective /individual	Instructions
Priority	1	2	3	4	5
Dangerous phenomenon	Avoid as much as possible dangerous phenomenon	Informing and training on the hazards			Teleology and instructions to avoiding the hazard
Hazardous situation	Limiting (preventing or reducing) exposure to the unavoidable hazards	ensure awareness of risks and prevention measures	Avoiding put in dangerous situation		Instructions and teleology to avoid setting dangerous situation
hazardous event	Minimize the occurrence of hazardous event	Pose d'une affiche ou le rangement systématique d'une voie de circulation			Pose a poster or systematic storage of a taxiway
Avoidance of damage	Avoid damage by limiting devices or restraint	provide information on the organization		Avoid injury by wearing I.P.E	Instructions and teleology to avoid the damage
Damage reduction		ensuring learning basic gestures of survival to practice		Reduce the damage by wearing I.P.E	Instructions and teleology to reduce damage

Figure 3. Prioritization of safety measures (Kharzi et al., 2020)

3. ***Collective protection measures***: Measures aimed at protecting several people of hazards by removing or reducing dangerous situations, e.g.: sound insulation of premises, fume extraction and / or noxious fumes at the source, ventilation system etc. The implementation of collective protection is always better.

4. *Individual protection measures*: Measures aimed at protecting only the operator. Individual protection can only be considered when all other elimination or risk reduction measures prove insufficient or impossible to implement.

5. *Instructions*: Information and teleology of the person, the information can be visual (poster, sign, light, etc.) or sound (siren, etc.). They can be given on the occasion a training (instructions, procedures, authorization, certified electrical, etc.).

4. CONCLUSIONS AND RECOMMENDATIONS

Safety, industrial hygiene and environment are managed like all other industrial activities. Therefore, they require the right direction, reflection, values, and principles of action, of ethical and deontological behaviors (Anglogold, 2001; SNES, 2006), rigor and perseverance, with the slogan: "Dismiss an evil from the road is charity".

For this, it is necessary that the employer commits that employees get involved and that the professional in health and safety at work supervise and accompany all health and safety action plan. Success in this field is also a revealing indicator of the overall performance of the company (Abdi et al., 2020). Therefore, any company must make a strong commitment to an occupational risk prevention project: « process of continuous improvement ». Accidents and occupational diseases can be avoided if the risks are identified and if preventive measures are adapted to the working conditions (Bernier, 2003). A work accident is expensive. This is why (Kharzi et al., 2020):

The employer is required:

- To inculcate within the company, the following principle: *"The good behavior is the best thing that has been given to people"*.
- To inform about the dangers incurred and advise on safety measures;
- To make available the appropriate personal protective equipment if necessary (goggles, gloves, protective clothing, hearing protectors, etc.);
- Taking in the workplace the measures required to prevent accidents and occupational diseases;
- Ensuring to the staff or the representatives the right to be consulted for all the safety issues.

The employee is required:

- Backing these actions on the principle: "*Allah loves when someone makes something, he does it with care*";
- To respect the instructions of the employer's occupational safety;
- To consider all general safety rules and specific to the workplace "*After faith, no one has ever received a better grace than health*";
- To properly use safety devices, wear personal protective equipment;
- To remedy without delay any failure that could be dangerous, or if this is not possible, report to the employer, where appropriate, professional representatives;
- Do not undermine the effectiveness of the safety devices and do not be in a dangerous state for himself and the other (pharmaceuticals, drugs, etc.);
- And it is logically added, to keep informed and to train permanently in health and safety at work.

Finally, it can be said that belief and commitment to work have made all the principles of hygiene, safety and preservation of health and the environment a cult, a belief and a good deed.

REFERENCES

Abdi, M., Chaib, R., & Verzea, I. (2020). Contribution to the occupational risk assessment for sustainable management in health and safety at work: case study; Acta Technica Napocensis Series: Applied Mathematics, Mechanics, and Engineering, 63(IV). 441.

Agence française de sécurité sanitaire des aliments (Afssa) (2008); A qualitative method for estimating risk in animal health, ISBN 978-2-11-098836-2, juillet 2009 A (French).

Amrani, M., Chaib, R., Bouzaouit A., & Verzea, I. (2020). Well-being at work: a lever for sustainable performance in workplace, Mining Science, 27, 89–104.

Anglogold, A. (2001). Code of Ethics and Business Conduct, South Africa. (in French).

Aouati, S., Chaib, R., Cozminca, I., & Verzea, I. (2017). Map risks in the company: highlight at the top priority risks. World Journal of Engineering, 14(6), 550-555.

Association paritaire pour la santé et la sécurité du travail du secteur affaires sociales (ASSTSAS) (2016), Prevention Program - Blood Exposures in Healthcare Workers; ISBN : 978-2-89618-043-1, Code : 346-0413-4C (GP68)

Auduberteau, K. G. (2003). The prevention of occupational risks: health and safety at work, collection "territorial employment diagnostics. Recruitment and Social Protection; Recruitment and Social Protection Department, October 2003 (French).

Bernier, S., Decornois, I., Freyria, A.M., Lomberget, J.P., Lucas, C., & Sanglerat, M.B. (2014), Bernier S et al. Prevention, health, safety and environment notebooks, national center for scientific research CNRS, (in French).

Bochmann, F., Hartlieb, D., Meffert, K., Mur, J. M., Nold, A., Pils, P., & Stamm, R. (2004). Prevention of industrial risks, Current practices and guidelines for research, International Committee for Research, ISSA Prévention Series 2049. (in French).

Bossard, L. (2005). Cleaning activities and associated services, risk prevention (French), ED 963, INRS 2005.

Bouvier L., Cavaillé J., Champenaud A., Pardon C., & Telliez J. (2008) Occupational psychology at the service of your organization, Work accidents, Psychactu, 5. (in French).

Chaib, R. (2016). For sustainable development in health and safety at work in companies, European University Editions, deutschland, Germany. (in French).

Chaib, R., & Bénidir, M. (2016). For a Sustainable Development in Occupational Safety and Health. Occupational Medicine & Health Affairs 4, 231.

Colin L. (2002). International Labor Office (BIT) Colin L. Chapter 19 - Ethical issues; Codes and guiding principles; Encyclopedia of occupational health and safety, 3rd edition. (in French).

Diane, G. T., & David R., (1996). The Japanese model of production and human resources management: towards a hypothesis of hybridization in Japanese companies in Quebec; fifth conference of the International Association of Strategic Management Lille, (in French).

Dumas, M, (2005). From absenteeism management to health management in a cosmetics company, 20-21. (in French).

French Labor Code, Legislative Part. (2002). Preliminary chapter: General principles of prevention; (Law nº 2002-73 of January 17, 2002 art. 173 Official Journal of January 18, 2002). (in French).

Hazards and prevention / Concepts and general principles. (2008) SHEET 02B According to the REPMI document: 'Guide to the national network of educational resources in industrial maintenance'. MAP/DGER/Inspection of Agricultural Education, Updated on 4/11/08. (in French).

https://al-maktaba.org/book/31615/17111#p6
https://www.islamweb.net/ar/library/index.php?page=websearch&bk_no=74

International Labor Office. (2004). Global strategy on occupational safety and health, Conclusions adopted by the International Labor Conference, 91st session 2003, 1st edition 2004 Geneva. (in French).

Kharzi, R., Chaib, R., & Akni, A. (2020). Prioritizing the actions to be undertaken in health and safety at work: case study region of Tiaret", International Journal of Law and Management, 62(3), 267-275.

Kharzi, R., Chaib, R., Verzea, I., & Akni, A. (2020). A Safe and Sustainable Development in a Hygiene and Healthy Company Using Decision Matrix Risk Assessment Technique: a case study". Journal of Mining and Environment, 11(2), 363-373.

Martin, R. (2013). Well-being and efficiency: for a policy of quality of life at work; Terra Nova – Note - 1/22 March 2013. (in French).

Messenger of Allah Muhammad (peace be upon him). Said "Allah loves when someone makes something, he does it with care" , Narrated by Al-Tabarani in (Al-Awsat) °891 p. 109 - Archive of the People of Hadith Forum - Hadith investigation. considered good by Albâny, (Arabic).

Messenger of Allah Muhammad, (peace be upon hi) said: The good behavior is the best thing that has been given to people, It was narrated by Al-Hakim, in Al-Mustadrak on the Two Sahihs, No. 3398. (Arabic)

National Union of Security Companies (SNES). (2016). Code of professional ethics for private security, October 2006, (in French).

Patric, B., Geneviève, D., Manon, L., & Marielle, P.F. (2012). The development of a culture of health and safety at work, summary of the research ; International Seminar 'Masters in Training Management' University of Sherbook, September 2012, (French).

Patrick, G., & Marina, C. (2004). How to assess HR performance? Universal question, contingent answers; IAE of Paris (University of Paris 1 Panthéon - Sorbonne) - GREGOR - 2004-05(, French).

Philippe, J., & Arnaud, P.T. (2009). From the collective to the working community: attachment and performance; XVIIIth International Conference of Strategic Management Grenoble, June 2, 3, 4 and 5, 2009. (French)

Régis, D. (2002). What is a religious fact? Review studies 2002/9 (tome397); ISSN: 0014-1941, (French).

Salmi, S., & Chaib, R. (2016). Feedback a learning tool for future organizations", World Journal of Engineering.

Scrima, F. (2014). Understanding attachment to work to act on comfort at work - Psychology of Work and Organizations, 2014 – Elsevier (French)

Soline, R. (2016). 2.6 million Deaths per year because of the environment, le Figaro.fr la santé, 03/15/2016, (French).

Taleb, M., Bouzerara, R., & Chaib, R., (2022). Contribution to the Evaluation of the Influence of the Health Epidemic on the Quality of Life at Work (QWL): a Case Study." *Polish Journal of Environmental Studies*, 2022. doi:10.15244/pjoes/150018. http://www.pjoes.com/Contribution-to-the-Evaluation-of-the-Influence-nof-the-Health-Epidemic-on-the-Quality,150018,0,2.html

United Nations Industrial Development Organization (UNIDO). (2014). For Inclusive and Sustainable Industrial Development: Creating and Sharing Prosperity | Protecting the environment, February 2014.

Work and safety file, Individual Protection, INRS, update 09/01/2006, (French).

Volume XIX, Issue (1) (2023) 273-279

International May Conference on Strategic Management

EVALUATION OF ERGONOMIC PRINCIPLES IN WELDING PROCESSES

Aleksandra Krstevska*

Faculty of Mechanical Engineering - Skopje, Republic of N. Macedonia

Abstract: This research paper gives a brief overview of the welding environment and ergonomic principles in welding processes. Welding plays a significant role in manufacturing, particularly in industries that use complex metal components and structures. This is why welding is the most widely used process in modern industry and a process that is followed with harms and dangers for the welding operator. Welding often requires non-physiological body positions and in the welding processes, body positions and time are key factors in causing injuries. Special attention is given to the ergonomic principles and their application in the welding processes. From the presented paper a conclusion is drawn - what can be improved, what are the solutions for potential problems, how to avoid dangers and harms, factors that influence to the design of the job. With application of ergonomic principles and ergonomic solutions in welding processes can significantly reduce the harms and dangers.

Keywords: ergonomic principles, welding processes, harms, dangers

1. WELDING AND WELDING ENVIRONMENT

Welding is a major joining process primarily used for the creation of metal structures and components. It is metal-joining fabrication process that employs heat, pressure, or a combination of the two, with or without filler material, to create a strong and permanent connection between the assembling metal parts. The solidification of the molten metal at the interface of the joining parts results in metallurgical bonding, which forms a solid welded joint with improved properties over the base metal (SLIC, 2018). The different welding processes can be divided into two categories: fusion welding and pressure welding, Figure 1 (Runchev, 2014).

The welding environment is characterized by high temperatures, gasses interactions, heat, electricity, radiation, flames, fire, noise, welding fumes etc. as shown in Figure 2. It is considered that the most dangerous welding byproducts are fumes and gases (Golbabaei & Khadem, 2015). All the above-mentioned have a detrimental effect on the health of the worker and the work environment.

* *Corresponding author: aleksandra.krstevska@mf.edu.mk*

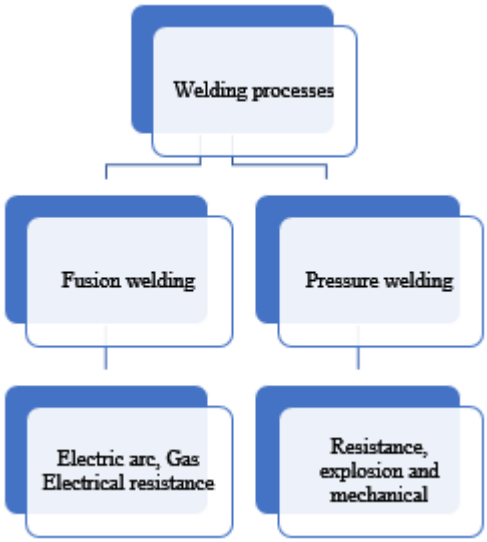


Figure 1. Classification of welding processes (Runchev, 2014)

Figure 2. Harms in welding environment (Golbabaei & Khadem, 2015)

The welding fume consists of particles from the evaporated electrode and a little part of the basic material with chemical compositions that depend on the welding technique, parameters, electrode, basic metal, and flux composition (Berlinger et al., 2019). A summary of all chemicals, physical and radiation harms are presented in Table 1 (NIOSH, 2002).

Table 1. Common harms by-products during welding (NIOSH, 2002)

Fume	Aluminum, Cadmium, Chromium, Copper, Fluorides, Iron, Lead, Manganese, Magnesium, Molybdenum, Nickel, Silica, Titanium, Zink
Gases	Carbon Dioxide, Carbon, Monoxide, Nitrogen oxide, Nitrogen dioxide, Ozone
Radiant energy	Ultraviolet, Visible, Infrared
Other harms	Heat, Noise, Vibration

During the performance of the tasks the worker is exposed to the following injuries: burns, injuries to eyes from heat and ultraviolet radiation, poisoning from the polluted atmosphere etc.

To ensure full protection, it is necessary to know and set up appropriate measures to prevent any unwanted professional consequences, injuries and deaths. During the welding process, special care must be provided in any production or service process. Protection at work should be comprehensive, dependable and efficient. Therefore, it is necessary to ensure several basic conditions (Table 2) that reduce the chance of any injury or death.

Table 2. Basic conditions for reducing injuries or death

Basic conditions for reducing injuries or death	
1	Appropriate working space
2	Appropriate light
3	Good ventilation
4	Reduction of noise and vibration
5	Protective equipment with high quality
6	Machines and devices well protected
7	The machines and devices must be in good condition
8	Safe and organized internal transport
9	Health and safety regulations must be applied and respected
10	Self-awareness during work
11	Paths for movement to be properly marked.

2. SIGNIFICANT DANGERS AND HARMS

Welders need to be aware of all the potential harms, injuries or health risks they are facing with during work. They can be exposed to numerous harms due to welding and cutting processes. In the following tables (Table 3 and Table 4) are given the most significant dangers and harms (Official journal of R. of Macedonia, 2009).

Table 3. List of significant harms (Official journal of R. of Macedonia, 2009).

	HARMS
1	Inappropriate light
2	Use of flammable and explosive substances
3	Use of over scale physical force (manual load transfer, pushing or pulling, various long-term increased activities, etc.)
4	Non ergonomic position of the body (long-term standing, sitting, kneeling, etc.)
5	Receiving and transmitting information with high awareness. Respecting the rules of behaving, quick changes of work procedures, conflict situations, luck of motivation for work, etc.)
6	Chemical harms: dust, liquids, gases and smoke.
7	Physical harms: noise and mechanical vibrations

Table 4. List of significant dangers (Official journal of R. of Macedonia, 2009).

DANGERS	
Mechanical dangers	Insufficient safety due to unprotected rotating or moving parts.
	Using dangerous working tools that can cause explosion and fire.
Working environment dangers	Danger surfaces (floors, surfaces that employees encounter and have sharp edges, protruding elements, etc.).
	Working in a narrow, limited or dangerous space (between two or more fixed parts, between moving parts or vehicles, working space with luck of light and ventilation, etc.).
	Possibility of slipping or tripping (wet or slippery surfaces).
Electrical dangers	Danger of direct contact with electrical installation parts and equipment.
	Danger from thermal effects created by electrical equipment and installations (overheating, fire, explosion, electric arc or spark, etc.).
	Danger of electrostatic electricity effects.
	Dangers caused by other persons

3. ERGONOMIC PRINCIPLES AND THEIR APPLICATION IN WELDING PROCESSES

Ergonomics represents scientific discipline related with the understanding of the interactions among humans and other elements of a system, applying theoretical principles and methods to design in order to optimize human well-being and overall system performance (Dul et al., 2012).

Ergonomics aims to satisfy following objectives by ensuring productive and safe workplace: reducing injuries, ensuring worker safety, ensuring worker productivity, reducing compensation costs (in case of injury, etc.), reducing absenteeism, compliance with regulations (Polenakovic et al., 2012). If the goals of ergonomics are not accomplished, the workplace, the employee as well as the organization tend to be arising problems, i.e.: musculoskeletal disorders (MSDs), lower productivity, lower quality, repetitive motion injury, worker dissatisfaction, increased absenteeism, increased compensation costs, increased turnover rate, decreased compliance with regulations, increased insurance costs.

There is a lot for improvement in the welding postures which will help to reduce discomfort and pain, increase productivity, worker safety and quality of work in welding industry. Problems arise in the mismatches between welder and equipment and improper layout design. The tools used during the welding process are very important and the need of ergonomic evaluations and research for new solutions for their improvement contributing to reducing the harmful and negative effects that they have on the health of the welders (Resnick & Zanotti, 1997; Jain et al., 2018).

The principles of ergonomics are divided into two groups: 10 physical principles and 10 cognitive principles. In this paper the principles are discussed and how they can improve the working conditions of the selected workplace.

3.1. Analyse of physical principles in welding processes

Keep everything in reach – In the welding environment the welder has non-physiological working positions (job on working table, above the head and similar positions). The welder almost always needs to choose the working place (if the working conditions allow it) with the

aim of not stretching the body and making the work more difficult. The welder needs to avoid unnecessary stretching, strain and keep everything within reach.

Work at proper height – The welder needs to often change his working positions due to the non-physiological body positions during the working day to reduce discomfort, fatigue and prevent injury. The height can be adjusted by adding or removing extensions to tables if the job is done on a working table.

Work in neutral postures – It is necessary to maintain the natural "s" curve posture of the back. It can cause strain on the neck and back working long with a "c" curve. It is necessary to take occasional breaks. By applying this principle to the welder, physical stress is reduced, there is no reduction in strength, and the completion of work tasks is done by applying a neutral position.

Reduce excessive force - This principle can be applied when the welder will lift heavy and robust objects in such a way that the legs and not the back muscles are stressed. For very heavy objects load lifter should be used, wearing protective gloves and take occasional breaks during work.

Minimize fatigue and static load - It is necessary to take frequent short breaks to reduce fatigue, bearing in mind that welding can be done in very inappropriate positions of the body. Maintaining proper posture is crucial. An example of static load is holding elements for prolonged periods.

Reduce excessive motions – Avoid repetitive motions and using a gravity wherever is possible for movement of materials to the working environment, to enable unnecessary material handling.

Provide clear paths - The application of this principle requires barrier-free movement paths, welding not in the proximity of power cables and near pipes from gas cylinders. Do not block the workplace and passages with unnecessary elements.

Minimize contact stress - Use of ergonomic burners that reduce the load on the palm and forearm.

Ensuring mobility and change of body position - Clear movement paths, short breaks during various welding positions.

Maintain a comfortable environment - Replacement of broken lights or install of better lightening to prevent eyestrain. Ventilation of the workspace due to possible exposure of toxic gases, mechanical ventilation of the workspace where necessary. Pleasant working temperature and air humidity in the workshop.

3.2. Analyse of cognitive principles in welding processes

Standardization - Using standards to provide instructions and information to employees for the correct and safe use of work equipment.

Using stereotypes - In welding environment, the use of stereotypes will help in the safe execution of certain tasks such as: using a red stop light, rotating the handle clockwise to turn the arrow to the right, or increasing a parameter.

Simplified presentation of information - By applying this principle and placing visual images - photos, symbols or signs in the welding workshop, the information becomes more remarkable and understandable for all employees in the workplace.

Presenting the information with an appropriate level of detail - Using a digital display to view amperage and voltage while welding.

Presenting clear images - Visible pictures for the danger of electric shock where the welding machine is located. The gas cylinders are marked with the type of shielding gas.

Providing a variable stimulus - Turning the sirens on when the maximum allowed volume of gases is achieved if there is no mechanical ventilation.

4. CONCLUSION

This paper gives a review of the both ergonomic principles and how they can be applied in welding processes. The use of physical and cognitive principles can significantly reduce the harms and dangers on the intended workplace.

By the mean of the principle "keep everything in reach" is possible whenever the employee can choose place and way of work by himself. The possibility of stressing the toes and not the back muscles when lifting a load, leads to "reduction of excessive energy". Frequent short breaks affect "reduction of fatigue", bearing in mind the fact that welding can often be done in non-physiological body positions. The change of burners with new ergonomic burners reduces the load on the palm and forearm and thus "minimize contact stress".

By keeping clean movement paths and passageways from unnecessary objects, the principle of "provide clear paths" is applied and the free space needed for body movement (head, hands, body) is enabled, following the influence of "comfortable working environment" that enables basic working conditions.

When we discuss about cognitive principles, related to the perception and understanding of symbols, stereotypes, use of schemes, their application can make significant improvements in the chosen workplace.

By using "standards", providing instructions and information that are easily accessible to employees, the correct and safe use of work equipment is enabled. "Using stereotypes" in welding workshop will help in safe execution of the assigned tasks.

By applying the principle "simple presentation of information", the information becomes more visual and understandable. With the "presentation of clear images", danger of electric shock, flammable gas, etc., are clearly and noticeably presented.

Applying the physical and cognitive principles will provide significant results in the intended workplace, increased efficiency, increased quality, reduced workplace injuries and absenteeism.

Any change and redesign of a workplace should be done in correlation with welders, so, they can be a part of the design process, providing initial values, interaction with employees, discussion of viable solutions and avoiding harms.

REFERENCES

Berlinger, B., Weinbruch S., Ellingsen D.G., Zibarev E.V., Chashchin V.P., Chashchin M., & Thomassen Y. (2019). On the bio-accessibility of 14 elements in welding fumes. Environmental science. Processes & impacts, 21 3, 497-505.

Dul, J., Bruder, R., Buckle, P., Carayon, P., Falzon, P., Marras, W. S., ... & van der Doelen, B. (2012). A strategy for human factors/ergonomics: developing the discipline and profession. Ergonomics, 55(4), 377-395.

Golbabaei, F. & Khadem, M. (2015). Air Pollution in Welding Processes - Assessment and Control Methods. 10.5772/59793.

Jain, R., Sain, M. K., Meena, M. L., Dangayach, G. S., & Bhardwaj, A. K. (2018). Non-powered hand tool improvement research for prevention of work-related problems: a review. International journal of occupational safety and ergonomics, 24(3), 347-357.

NIOSH (National institute for occupational safety and health) (2002). Nomination of welding fumes for toxicity studies. Available at: https://ntp.niehs.nih.gov. (17th January 2023).

Official journal of R. of Macedonia. (2009). Regulation for preparing a safety statement, its content, and the data that should be provided based on risk assessment.

Polenakovic, R., Chaloska, J., & Naumovska, B. (2012). Ergonomics. Republic of North Macedonia: National Centre for Innovation and Entrepreneurial Learning Development. (in Macedonian).

Resnick, M. L., & Zanotti, A. (1997). Using ergonomics to target productivity improvements. Computers & Industrial Engineering, 33(1-2), 185-188.

Runchev D. (2014). Joining techniques. Republic of North Macedonia: University: St Cyril and Methodius, Skopje. (in Macedonian).

SLIC (Senior Labour Inspectors Committee Employment). (2018). Social Affairs & Inclusion: Guidance for National Labour Inspectors on addressing health risks from Welding Fume.

Volume XIX, Issue (1) (2023) 280-290

International May Conference on Strategic Management

ECONOMIC POLICY UNCERTAINTY IN BRAZIL: IMPROVING MEASUREMENT AND INVESTIGATING THE RELATIONSHIP WITH STOCKS RETURNS

Saulo Barros de Melo*, Lucas Ayres Barreira de Campos Barros

University of São Paulo, Brazil

Abstract: This research developed a novel index of economic policy uncertainty (EPU) for Brazil based on the frequency of news posted by news portals in the country. Unlike the existing index, the measurement proposed is based on news from different journalistic sources. The development of the index was based on data extraction via web-scraping. In this sense, the present research evaluated the role of economic policy uncertainty in its relationship with excess returns of Brazilian stocks. The results indicated a negative impact of this uncertainty on the stock market. In addition, the new index presented a better fit to the proposed model than the existing one, indicating that it is more suitable for use under the evaluated conditions. Thus, the results show that the study is relevant not only for deepening the understanding of uncertainty under the proposed evaluation conditions but also to create a measurement for future evaluations of economic policy uncertainty in the country.

Keywords: economic policy uncertainty, stock returns, Brazil

1. INTRODUCTION

Uncertainty has been the subject of investigation in different areas of knowledge. Whether in theoretical or practical fields, the concept of uncertainty permeates different aspects of social dynamics and is of great interest for human understanding. In this sense, in the field of economics, economic uncertainty has also been the subject of evaluation, having a series of implications in markets.

In this context, it is important to understand that economic uncertainty cannot be seen as a concept of simple definition. Its complex and difficult-to-determine nature (Bloom, 2014) exposes even more the need for a deep evaluation that starts from its theoretical contextualization to its measurement and application.

However, uncertainty has various faces, and considering it as something homogeneous is to reduce its broad nature to a limited condition. In this sense, studies focused on the evaluation of economic policy uncertainty stand out. This concept is related to future uncertainties in government policies and regulatory structures (Al-Thaqeb & Algharabali, 2019).

Baker et al. (2016) associates the concept of uncertainty about economic policy as uncertainty related to the agents who define economic policies, what their definitions are, when they make these definitions, and the consequences of these decision-making processes.

* *Corresponding author: sbmelo@usp.br*

In this context, there is a close relationship between economic policy uncertainty and different social phenomena, so that various empirical efforts are trying to observe specificities of events with explicit influence on uncertainty. In this context, Nilavongse et al. (2020) evaluated uncertainty shocks such as Brexit in the UK economy, and Goodell et al. (2020) investigated the relationship between electoral uncertainties and EPU in the context of the US.

Moreover, the COVID-19 pandemic and its different global economic impacts stands out, such as the increase in economic policy uncertainty, that caused various impacts on economies (Al-Thaqeb et al., 2020; Choi, 2020; Youssef et al., 2021).

Among the different impacts, those associated with the stock markets stand out. Various empirical studies have shown influence of EPU on the return of stocks in different countries (Phan et al., 2018; Huang & Liu, 2022), including in the Brazilian market (Gea et al., 2021).

In this sense, Brazil is especially interesting for evaluating economic policy uncertainty not only because it is the largest stock market in Latin America but also because of the multiplicity of events associated with such uncertainty in the country. Recent events such as the last impeachment, several corruption scandals, and problematic relations between executive, legislative and judiciary illustrate that and expose an imperative for understanding the influence of economic policy uncertainty on the Brazilian market.

It is also important to highlight that the evaluation of the influence of economic policy uncertainty on markets must be accompanied by an adequate measurement of it to properly understand this relationship. In this sense, some measures of this uncertainty have shown the ability to capture different social phenomena, as observed especially after the methodological innovations of Baker et al. (2016).

In the Brazilian context, despite the relevance of economic policy uncertainty and its measurement, there was only one measure for quantifying the concept and that measure needs refinements. Thus, the present research seeks to answer the following research question: How does economic policy uncertainty relate to stock returns in the Brazilian market?

Therefore, the general objective of this study is to investigate how economic policy uncertainty affects stock returns. The specific research objective is to create a new index of Brazilian economic policy uncertainty. In this sense, the literature has generally presented a negative relationship between economic policy uncertainty and stock returns (Al-Thaqeb & Algharabali, 2019). This relationship is associated with the pessimism in the future expectations of market agents regarding the economic policies to be adopted, which would lead to a drop in stock prices (Li et al., 2016). Thus, considering the importance of understanding the elements that permeate the dynamics of the stock market, investigations have sought to deepen the evaluation that relationship (Brogaard & Detzel, 2015; Phan et al., 2018), including in Brazil (Quintero et al., 2020; Gea et al., 2021), as the present study proposes.

Furthermore, in this context, it is important to highlight that economic policy uncertainty has a lot of implications beyond the influence on stock returns, and there has been a progressive incorporation of this into economic models, which reinforces the relevance of the topic addressed by this research. Decreased investments and hiring (Bloom, 2014), reduced economic growth (Al-Thaqeb & Algharabali, 2019), influence on oil prices (Balcilar et al., 2017), and even impact on cryptocurrency prices (Bouri et al., 2019) are examples of these implications of uncertainty mentioned, which are increasingly being evaluated.

Thus, having understood the importance of studying economic policy uncertainty, it is necessary to question the means of operationalizing this concept in models. In this sense, the measurement emerges as a central element of the investigation process, necessary for understanding uncertainty in a given country or region.

In the Brazilian case, the nature of the two current indices that quantify uncertainty in Brazil (Baker et al., 2016; Ferreira et al., 2019) reinforces the need for refinement in search of

a more appropriate measurement of economic policy uncertainty. Baker et al.'s (2016) instrument, applied to Brazil, measures the EPU monthly and is exposed only to one data source. This dependence can be problematic, as such exposure can generate the possibility of bias and newspaper coverage has relevance for constructing economic policy uncertainty indices (Ghirelli et al., 2019). On the other hand, Ferreira et al.'s (2019) index is restricted to assessing economic uncertainty without analyzing its political aspect.

In this sense, in addition to the Brazilian elections in 2022, two other events reinforce the relevance of the proposed investigation. Initially, the COVID-19 pandemic brought economic challenges and uncertainty in the global context but without adequate investigations on the effect of this uncertainty on the domestic market. Additionally, conflicts in Ukraine are potentially relevant to the investigation, given that historically wars have been associated with increases in economic policy uncertainty (Baker et al., 2016), including in the context of tensions between Russia and Ukraine and the Crimean dispute (Charemza et al., 2022).

2. THEORETICAL MOTIVATION

2.1. Uncertainty and stock market

The idea of uncertainty presents itself as a complex concept with a challenging definition. One of the first theoretical efforts immersed in the economic context around the understanding of this construct refers to Frank Knight (1921) and his unprecedented conceptual construction at the time, which was considered the basis for subsequent definitions of uncertainty. Such definition, by differentiating uncertainty and risk, exposes the conceptual depth of it.

In this context, the advancement in studies on uncertainty is evident not only by the progressive increase in research on the topic but also by the refinement and consolidation of definitions of the concept. In this sense, Bloom (2014) defines economic uncertainty as a feeling of doubts from different economic agents, such as consumers, managers, and policymakers, about possible future scenarios.

As seen, the complexity of the concept of uncertainty leads to the understanding that it is not a homogeneous concept with a simple definition. In this context, the present research focuses on understanding its form associated with economic policy, which in summary consists in the ambiguity regarding future economic policies to be adopted by governments (Al-Thaqeb & Algharabali, 2019).

In this sense, the concept of economic policy uncertainty presented by Baker et al. (2016) evidences the existence of several factors of uncertainty, some of them even considered "non-economic," such as wars. The capture of these factors by researchers, immersed in the American economic context, evidences a deep and multidisciplinary concept given the complexity of different social phenomena that interact with the idea of economic uncertainty.

Thus, make sense to question, for example, if the mapping of uncertainty equally across different economies given the variety of situational realities. In this sense, the influence of economic policy may vary according to the country and its economic aspects such as the size of the stock market. To illustrate this complexity, Bloom (2014) indicates that developing countries have higher average economic uncertainty, which reinforces the need for an evaluation of the functioning of this asymmetric dynamic of uncertainty in different countries.

In this sense, an important front of evaluation of the implications of economic uncertainty refers to its influence on macro and microeconomic variables. These implications range from decreased investments and hiring (Bloom, 2014) to reduced economic growth (Al-Thaqeb & Algharabali, 2019). In this context, the evaluations that associate said uncertainty with stock returns are highlighted, as this study proposes.

Thus, just like the concept of uncertainty, the relationship between economic policy uncertainty and stock returns also proves to be complex and with various specificities. In this context, Phan et al. (2018) observed that there are different effects of uncertainty on the stock market depending on the country.

Despite this asymmetrical effect, there is generally a negative relationship between economic policy uncertainty and stock returns (Al-Thaqeb & Algharabali, 2019), especially in large economies, as observed in various studies conducted in the American context (Brogaard & Detzel, 2015; Baker et al., 2016; Rehman et al., 2019).

Limited investigations of this association in Brazil show a negative relationship between EPU and stock returns, as observed in Gea et al. (2021). However, the theoretical framework still requires further development, especially since emerging countries have shown less directional results than developed countries in this relationship (Rehman et al., 2019).

Rehman et al. (2019) investigated the relationship presented here from a sectoral evaluation, finding significant differences depending on the sector of activity of companies, in the sensitivity of stock returns to US economic policy uncertainty. In this case, the evaluation was limited to American companies and indicated, for example, that sectors such as IT and communication could be less sensitive to this uncertainty.

This phenomenon may be related to the differences in the sensitivity of certain sectors to political directions (Baker et al., 2016). The asymmetric evaluation of the impacts of academic uncertainty influence by sector, although relevant, is mainly observed in large economies such as the United States (Phan et al., 2018) and China (Su & Liu, 2021) without further developments in economies such as Brazil.

Therefore, considering the literature direction, the following research hypothesis is proposed:

H1: Economic policy uncertainty is negatively associated with stock returns.

2.2. Measurement of Uncertainty

As seen, uncertainty plays a structural role in economic dynamics and has been the subject of various investigations over time. However, unlike variables typically present in economic models such as employment and industrial production, uncertainty is not a directly observed variable. The complexity concept of uncertainty exposes a scenario that there is no perfect way to measure it, with a wide range of uncertainty proxies in their various forms (Bloom, 2014).

The measurement of uncertainty, in the case of economic policy, plays a fundamental role in its empirical theoretical structuring. In the stock market, for example, one of the most traditional forms of measuring uncertainty refers to checking volatility. However, this proxy only measures the uncertainty present in the market, which makes it difficult to use in different contexts due to different specificities.

In this sense, Baker et al. (2016) emerges as a central element for measuring EPU. Pioneeringly, the authors aggregated a series of elements in the evaluation of this uncertainty, measuring it from data collection of news in newspapers. Baker et al. (2016) is a landmark in research in the area and influenced a series of empirical developments from the study.

The innovations brought by Baker et al. (2016) generated a significant increase in empirical investigations into economic policy uncertainty. The innovative way of measuring uncertainty has led to a series of replications of the methodology in different markets, given its positive ability to capture uncertainty in different markets and scenarios.

In addition, the progressive increase in computational power associated with the massification of its use has assisted in the operationalization of the referred methodology. In

this sense, the use of web-scraping techniques has facilitated the measurement of economic uncertainty, as observed in different studies, including in Brazil (Ferreira et al., 2019).

Considering the context and understanding uncertainty as a subjective perception measured by different proxies, it is necessary to evaluate these measures and their relevance within the theoretical framework formed. Such evaluation should be based on the adequacy of uncertainty measures in different time periods, thus reinforcing the relevance of the role of the formulators of these measures.

In other words, the adequacy is also based on the evaluation of uncertainty measures and whether they can capture moments of explicit uncertainty. Contexts of war, political instabilities, Brexit, and the Covid-19 pandemic are examples of these moments that tend to provoke an increase in uncertainty and therefore should have an impact on these measures.

3. RESEARCH METHODS

3.1. Index of uncertainty of Brazilian economic policy

The data collection of the present study plays a central role in its elaboration. Since one of its purposes is to formulate an index from primary data, a rigorous methodological structure is necessary for the extraction of raw data, which in this case will be taken from the internet.

The research's methodological starting point is Baker et al.'s (2016) studies. Thus, the index developed will be based on the daily frequency of news broadcasted in different Brazilian newspapers related to the uncertainty of economic policy from March 2017 to December 2022.

The choice of this time frame is associated with the operational viability of data extraction. The conditions for accessing the desired raw data within the Brazilian context, in this case news from journalistic sources, expose Twitter as a viable alternative for this purpose.

Twitter has been used as a data source in various studies from different fields of knowledge, including economic and financial analysis. In this sense, within the Brazilian context, the efforts of Ferreira et al. (2018) in measuring and evaluating economic uncertainty in Brazil stand out. The authors not only captured events associated with such uncertainty but also assessed that shocks were followed by reductions in economic activity, leading to a slower financial recovery in the country.

In this context, the methodological aspect of the study stands out since Ferreira et al. (2018), using Twitter, demonstrated a similar behavior of measuring this uncertainty in the country from the social network when compared to direct extraction via news portals and print, thus suggesting Twitter as a potentially adequate data source for this research project.

In this sense, the present research collected 815,762 tweets from Folha de São Paulo, G1, and Extra, which are the main journalistic portals. Thus, after collected the tweets from these portals, web-scraping processes were executed to extract the textual data of each publication associated with a particular news from each newspaper. That is, news of all themes was initially extracted for subsequent selection.

The articles were classified according to the methodological structure of Baker et al. (2016). Thus, news in which terms related to uncertainty, policy, and economy found were filtered. Therefore, this classification was made from the structuring of three different groups. The presence of at least one term from each group in the textual body of the news was necessary to be associated with the uncertainty of economic policy.

After extracting and classifying the news as related to uncertainty about economic policy or not, it was necessary to count them to structure the index. Simply adding up the incidence of news related to the theme would not be enough for the proper construction of the index given possible variations in the total volume of news depending on the time and newspaper.

Therefore, the proportion of news related to the theme within the total universe of news in a certain time frame of each newspaper is calculated, in this case monthly, according to Baker et al. (2016), for later standardization and normalization of time series.

Rtweet (Kearney, 2019) was used to facilitate the interaction between R software and Twitter's API for extracting data from the social network. With the tweets in hand, it was necessary to extract the textual content of each news associated with each publication on the social network. Thus, web-scraping techniques were used to extract and organize this data from Python. After that, Sentometrics package (Ardia et al., 2021) was used to structure, quantify and classify the news in order to convert this textual data into time series indexes, such as the proposed index.

Thus, the methodological design proposed here for the execution of the main index of uncertainty about Brazilian economic policy itself shows the differences between it and the other two existing indices related to Brazilian uncertainty. Baker et al. (2016) index and the instrument proposed here are measures of economic policy uncertainty. However, there are several structural limitations to Baker et al. (2016) index that this project intends to address, such as the dependence on a single data source, in this case Folha de São Paulo.

In addition, there are even more significant differences between the index of this research and Ferreira et al.'s (2018) measure. Ferreira et al.'s (2018) index does not measure the same concept, this measure evaluates only economic uncertainty, without specifically evaluating the political aspect of uncertainty.

3.2. Data and econometric model

The present study used data from May 2017 to December 2022, with the following monthly data:

- Brazilian economic policy uncertainty 1 (EPU_BA) - an index developed by Baker et al (2016) based on news from Folha de São Paulo.
- Brazilian economic policy uncertainty 2 (EPU_BR) - an index structured in this study based on news from different Brazilian news portals.
- Excess return (RE) - calculated from the excess return of the risk-free rate, in this study calculated by Selic, the basic interest rate of the Brazilian economy.
- Volatility (VOL) - natural logarithm of the total value of the company's assets.
- Dividend Yield (DY) - annualized dividends paid by companies belonging to the Ibovespa index.
- Economic activity (CLI) - an index that measures Brazilian economic activity calculated by the Organisation for Economic Co-operation and Development (OECD).
- Country risk (RBR): aggregated index of Brazil's risk extracted from the Refinitiv platform.
- Low-risk investment average indicator (RREL): calculated from the difference between Selic and its 12-month moving average window.
- Global economic policy uncertainty (GEPU) - an index developed by Baker et al. (2016) based on data from 20 countries.

Thus, the econometric evaluation of the present study is based on the methodological procedures of Brogaard and Detzel (2015) for analyzing the effects of the relationship between economic policy uncertainty and stock market returns. Initially, the interaction between economic policy uncertainty and economic variables was evaluated based on the following equation:

$$EPU_t = \alpha + \beta X_t + \varepsilon_t \quad (1)$$

where EPU_t indicates the uncertainty of economic policy at a given time t, in this case two EPU indices will be evaluated, where ε_t refers to random error and βX_t corresponds to control variables VOL, DY, CLI, RBR, RREL, and GEPU.

The estimation of the above regression aims to explain market behavior by demonstrating the relationship between economic policy uncertainty and macroeconomic variables in the country to establish an association between them and their potential explanatory power in the market dynamics. However, this relationship is not sufficient to prove the adequacy of EPU in market return models, and further evaluations are necessary.

In this sense, the relationship between excess return of Brazilian stocks in the index Ibovespa and economic policy uncertainty with controls is analyzed using the following expression:

$$RE_{i,t} = \delta_0 + \delta_1 EPU_t + Controls_t + \varepsilon_t \quad (2)$$

where $RE_{i,t}$ indicates the excess return of a company i at time t, $\delta_1 EPU_t$ uncertainty of Brazilian economic policy calculated separately by the two indices, and Controls corresponds to the first difference of control variables VOL, DY, CLI, RBR, RREL, and GEPU. Finally, ε consists of the random error.

4. RESULTS

After constructing the new index, the aim was to compare it with Baker et al. (2016) measure to observe possible differences caused especially by the methodological improvement proposed in section 3.1. In this sense, a comparative graph of the two indices evaluated by this study is shown in Figure 1.

Figure 1. Brazilian EPU Indexes

The figure shows a similarity between the two indices. There is a high similarity in the behavior of the indices in the post-Covid-19 period. A correlation of 0.84 was found from January 2020 to December 2022. Over the entire period evaluated, a general correlation of 0.48 was observed.

As expected, the indices have similarities in their behavior, but they also differ in the way they capture economic policy uncertainty as they have methodological differences. In this sense, given the refinement in the methodology of creating the index, a greater adherence of this index is expected in capturing uncertainty and applying this measurement in models.

The results of the equation 1 show that most relationship are significant in most variables in both measurements. In the case of Baker et al.'s (2016) index, all variables individually

established significant relationships (p<0.01) except for DY. In the multiple regression, in addition to DY, RBR and GEPU were also not statistically significant. In this sense, VOL and RB had positive signs, while RREL, DY, CLI, and GEPU had negative coefficients.

In the index created by this research, all regressions obtained statistically significant (p<0.01) results both individually and in the multiple regression. In this case, VOL, RBR, and RREL have positive coefficients and CLI, DY, and GEPU have negative coefficients. In general, the results indicate that Brazilian economic policy uncertainty is related to the evaluated economic variables, so it can be assumed that EPU helps to understand the behavior of the stock market.

In this sense, it is necessary to evaluate the direct relationship between economic policy uncertainty and the stock market. Thus, from equation 2, the relationship between excess returns and economic policy uncertainty is analyzed through the two instruments used here.

In this context, Table 1 shows the results of the interactions between excess returns and economic policy uncertainty. Reg 1 and 3 show this relationship with additional control variables, Reg 2 and 4 evaluate the relationship through a simple regression. Initially, Table 1 indicates the relationship between excess returns and Baker et al.'s (2016) index. As expected, a negative relationship was found between the two variables, and the results of the simple regression presented a significant coefficient (-0.00018) indicating that for each increase of one standard deviation (72.64) of EPU, there is a decrease of approximately 1.31% (-0.00018 X 72.64) in excess returns of stocks. The multiple regression with this same EPU instrument also indicates statistical significance of the variable in the same direction.

Table 1. Excess Returns and EPU

	Baker's Brazilian EPU		New Brazilian EPU	
	Reg 1	Reg 2	Reg 3	Reg 4
Intercept	-0.70494***	0.03470***	0.08362	0.06223***
	(0.11429)	(0.00531)	(0.12286)	(0.00694)
EPU	-0.00024***	-0.00018***	-0.00059***	-0.00026***
	(0.00003)	(0.00002)	(0.00004)	(0.00003)
VOL	0.00006		0.00103***	
	(0.00023)		(0.00024)	
RBR	0.14000***		-0.00662	
	(0.02207)		(0.02338)	
RREL	-2.44502		5.61078***	
	(1.38378)		(1.35680)	
DY	-0.00639***		-0.00941***	
	(0.00085)		(0.00084)	
GEPU	0.00046***		0.00042***	
	(0.00005)		(0.00005)	
Adjusted R2	0.03671	0.00970	0.06172	0.01690
N	5133	5133	5133	5133

*** denotes 1% of statistical significance and standard error values appear in parentheses

Table 1 also shows the relationship between excess returns and EPU based on the index developed in this research. Similar to Baker et al. (2016), the coefficient of economic policy

uncertainty was also significant and negative (-0.00026), indicating that for each increase of one standard deviation (62.66) of EPU, there was a decrease of -1.69% (-0.00026 x 62.66) in excess stock returns. The results obtained with both instruments are in line with Gea et al. (2021) in terms of the negative relationship between excess returns and EPU. However, in terms of the intensity of this effect, the values found are slightly above the value (-1.1%) found in Gea et al. (2021) for each increase of one standard deviation of EPU.

In addition, the explanatory power of the models, represented by the adjusted R2, is a central element of this evaluation. The results obtained demonstrate a greater explanatory power of the models in which the instrument created by this study was present than those in which Baker et al.'s (2016) measure measured EPU. Thus, while in the simple model only 0.97% of the variance was explained with Baker et al.'s (2016) measure, an adjusted R2 of 1.69% was found in the regression with the measure from this research. The greater explanatory power of the instrument created in this study is also repeated in the multiple regression model and suggests a greater adherence to econometric models presented in this analysis. These results also indicate a possible greater ability of the measure to capture uncertainty, making it a more suitable measure for these purposes.

5. CONCLUSION

The uncertainty of economic policy plays a fundamental role in the Brazilian economic dynamics and has explanatory capacity in the relationship with stock returns in Brazil. This finding was reinforced in this study since such interaction was observed in both indices evaluated. Furthermore, the slightly higher effect than that found by Gea et al. (2021) can be explained by a moment especially marked by uncertainties given that the temporal scope significantly covers the COVID-19 pandemic.

In this context, it is important to emphasize that even before the coronavirus crisis, the country has historically undergone a series of events that generate uncertainty. Whether it is through impeachment processes or disputes between executive, legislative and judiciary the historical context of uncertainty that Brazil lives in reinforces the need for continuous evaluation and refinement of variables such as EPU and its impacts on the economy.

In this sense, the main highlight of this evaluation is the finding that the new index has greater explanatory power than the index created by Baker et al. (2016). Thus, the new index is possibly a more suitable element for measuring EPU in Brazil given its greater adherence to econometric models such as those presented in this research, possibly motivated by a better capture of economic policy uncertainty.

Despite the advances found in this study, limitations are observed in this evaluation. In this context, the temporal scope of the created instrument and the execution of only one econometric model for comparative testing of this instrument are particularly highlighted. Thus, it is recommended to expand the temporal scope and conduct different research with the instrument created here. In addition, a facilitated availability of the new index is recommended.

REFERENCES

Al-Thaqeb, S. A., & Algharabali, B. G. (2019). Economic policy uncertainty: A literature review. The Journal of Economic Asymmetries, 20, e00133.

Al-Thaqeb, S. A., Algharabali, B. G., & Alabdulghafour, K. T. (2020). The pandemic and economic policy uncertainty. International Journal of Finance & Economics, ijfe.2298.

Ardia, D., Bluteau, K., Borms, S., & Boudt, K. (2021). The R Package sentometrics to Compute, Aggregate, and Predict with Textual Sentiment. Journal of Statistical Software, 99(2), 1-40.

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring Economic Policy Uncertainty*. The Quarterly Journal of Economics, 131(4), 1593–1636.

Balcilar, M., Bekiros, S., & Gupta, R. (2017). The role of news-based uncertainty indices in predicting oil markets: A hybrid nonparametric quantile causality method. Empirical Economics, 53(3), 879–889.

Bloom, N. (2014). Fluctuations in Uncertainty. Journal of Economic Perspectives, 28(2), 153–176.

Bouri, E., Gupta, R., & Roubaud, D. (2019). Herding behaviour in cryptocurrencies. Finance Research Letters, 29, 216–221.

Brogaard, J., & Detzel, A. (2015). The Asset-Pricing Implications of Government Economic Policy Uncertainty. Management Science, 61(1), 3–18.

Charemza, W., Makarova, S., & Rybiński, K. (2022). Economic uncertainty and natural language processing; The case of Russia. Economic Analysis and Policy, 73, 546–562.

Choi, S.-Y. (2020). Industry volatility and economic uncertainty due to the COVID-19 pandemic: Evidence from wavelet coherence analysis. Finance Research Letters, 37, 101783.

Ferreira, P. C., Vieira, R. M. B., da Silva, F. B., & de Oliveira, I. C. L. (2019). Measuring Brazilian Economic Uncertainty. Journal of Business Cycle Research, 15(1), 25–40.

Knight, Frank H. 1921. Risk, Uncertainty, and Profit. Boston, MA: Hart, Schaffner & Marx; Houghton Miffl in Company.

Gea, C., Vereda, L., Figueiredo Pinto, A. C., & Klotzle, M. C. (2021). The effects of economic policy uncertainty on stock market returns: Evidence from Brazil. Brazilian Review of Finance, 19(3), 53–84.

Ghirelli, C., Pérez, J. J., & Urtasun, A. (2019). A new economic policy uncertainty index for Spain. Economics Letters, 182, 64–67.

Goodell, J. W., McGee, R. J., & McGroarty, F. (2020). Election uncertainty, economic policy uncertainty and financial market uncertainty: A prediction market analysis. Journal of Banking & Finance, 110, 105684.

Huang, W.-Q., & Liu, P. (2022). Asymmetric effects of economic policy uncertainty on stock returns under different market conditions: Evidence from G7 stock markets. Applied Economics Letters, 29(9), 780–784.

Kearney, M. (2019). rtweet: Collecting and analyzing Twitter data. Journal of Open Source Software, 4(42), 1829.

Li, X., Balcilar, M., Gupta, R., & Chang, T. (2016). The Causal Relationship Between Economic Policy Uncertainty and Stock Returns in China and India: Evidence from a Bootstrap Rolling Window Approach. Emerging Markets Finance and Trade, 52 674–689.

Nilavongse, R., Rubaszek, M., & Uddin, G. S. (2020). Economic policy uncertainty shocks, economic activity, and exchange rate adjustments. Economics Letters, 186, 108765.

Phan, D. H. B., Sharma, S. S., & Tran, V. T. (2018). Can economic policy uncertainty predict stock returns? Global evidence. Journal of International Financial Markets, Institutions and Money, 55, 134–150.

Quintero, L. G. do L., Medeiros, O. R., & Niyama, J. K. (2020). Modelo de Cinco-Fatores de Fama e French e o Risco de Incerteza Econômica no Mercado Acionário Brasileiro. The Journal of Globalization, Competitiveness and Governability, 14(1), 116–134.

Rehman, M. U., Asghar, N., & Hussain, J. G. (2019). Are disaggregate industrial returns sensitive to economic policy uncertainty. Physica D: Nonlinear Phenomena, 527, 121301.

Su, X., & Liu, Z. (2021). Sector Volatility Spillover and Economic Policy Uncertainty: Evidence from China's Stock Market. Mathematics, 9(12), 1411.

Youssef, M., Mokni, K., & Ajmi, A. N. (2021). Dynamic connectedness between stock markets in the presence of the COVID-19 pandemic: Does economic policy uncertainty matter? Financial Innovation, 7(1), 13.

Volume XIX, Issue (1) (2023) 291-300

International May Conference on Strategic Management

THE INFLUENCE OF DIGITAL LITERACY ON THE EMPLOYMENT RATE OF THE OLDER POPULATION

Anđelka Stojanović*, Isidora Milošević, Sanela Arsić

University of Belgrade, Technical Faculty in Bor, Serbia

Abstract: Information and communication technologies (ICT) have recently become essential in shaping employees' career trajectories. The changes brought by intensive digitization condition the growing demand for specific knowledge and competencies that constitute a new literacy paradigm - digital literacy. On the other hand, digitization processes can negatively affect older people and their working performance and employability. Using data from the Eurostat database, which contains international, comparable data, this study investigated the relationship between digital literacy and the employment rate of the older population. In order to define the elements of digital literacy, the level of computer skills, the way of obtaining ICT skills, and the ability to evaluate digital content were considered. The results show that in the age group, 55-64 is a statistically significant influence of the variables describing digital literacy on the employment rate. However, this influence is not proven when testing the population aged 35-44 and 45-54.

Keywords: digital literacy, ICT, older population, employment rate

1. INTRODUCTION

The intense changes that have occurred in recent decades in the development of information and communication technologies (ICT) not only affect industry and science but also have significant social and economic consequences. Globally viewed, society faces significant challenges regarding the availability and intensity of ICT use, which causes the emergence of numerous digital divides on global, regional, and even personal levels.

One of today's particular problems is the population's aging, which is a challenge in itself. By observing the statistics, a significant increase in the older population in the world can be determined. Namely, according to the United Nations (2022), by 2050, one in six people in the world will be over age 65, which would be 16% of the population. While the aging population trend started in the world's most developed countries, aging is recently noticed in middle and low-income countries. The largest share of the older population nowadays is in Europe and Northern America, with almost 19 percent aged 65 or over (in 2022), with further growth predicted in both regions. On the other hand, Northern and sub-Saharan Africa and most of Asia are projected to have relatively small proportions of older people in 2050, although the growth rate is evident.

In light of the aging population, society and industry face numerous challenges. The increase in the share of older people forces companies to redesign products and services,

* *Corresponding author: anstojanovic@tfbor.bg.ac.rs*

adapt to the new needs of older users, and take advantage of the opportunities that arise from this (Sallati & Schützer, 2021).

Also, the number of older employees is increasing, which, in the context of the pronounced digitalization of business processes, poses an additional challenge to the company's management that needs to be addressed. Namely, there are significant changes in employment patterns caused by technological changes, which require redesigning business strategies and orientation towards long-life learning. Considering that younger employees, Millennials, and Generation Z grew up in an environment already changed by digitization and connected with ICT in the early stages of life, they naturally adopt new technologies faster (Picatoste et al., 2018; Olejniczak, 2022). Therefore, the expectations of these age groups are actually a similar level of interaction with technologies in a working environment and dealing with the most modern technologies available (Wirthman, 2020). In contrast, older employees are less comfortable with the intense digitalization of the working environment and must make additional efforts to acquire the necessary digital skills. During that process, older employees often face prejudices and negative attitudes (Lissitsa et al., 2017), even with a certain degree of discrimination and digital exclusion. Nevertheless, the largest share of the labor force represents mature employees who cannot just be excluded from business processes.

In most European countries, retirement occurs between 60 and 65 years of age and even up to 67 in some cases (Greece, Italy, Norway, Denmark) (Finnish Center for Pensions, 2023). For this reason, it can be said that those who belong to the population aged 55-64 today will be in employment for another ten years. Nevertheless, they have specific valuable working and life experiences and soft skills that contribute to the business's success. Given that ICT is ubiquitous, differences in the level of digital skills cause deepening inequalities to the extent that a specific part of the population is deprived of adequate social inclusion and financial security. Therefore, monitoring the current level of digital literacy and the employment rates of the older population is an important research topic for the present and future of the economy and society.

This study aims to examine the relationship between the level of digital literacy and the employment rate and to determine whether there is a significant effect on the employment of the older population. The Principal Component Analysis and Multiple Linear Regression will be applied to test models that establish digital literacy and employment rate relations. Digital literacy will be analyzed as a multifactor phenomenon based on the data retrieved from the Eurostat database.

2. LITERATURE REVIEW

At the time of the significant progress of ICT and its influence in all spheres of life and business, there were occurrences of significant notable differences and the phenomenon of the digital divide arising as a result of inequality in access and the level of use of digital technologies. Certain studies show that the impact of ICT on economic performance is not the same everywhere and depends on the country's economic development level (Mayer et al., 2020). Lucendo-Monedero et al. (2019) aimed to identify spatial inequality in the digital development of European households and individuals at the regional level. They find that the digital divide among European regions is identified in a north/west-south/east pattern. Zilian and Zilian (2020) presented empirical evidence that digital inequalities also occur in developed countries. Nevertheless, they point to the positive effects of a high socio-economic background on reducing problems caused by digitization. Galperin and Arcidiacono (2021) investigated gender digital differences and their impact on participation in the workforce and

confirmed the connection between employment and internet use. Given that digital exclusion is observed in certain age groups, digital divides based on ageism are becoming the subject of numerous research and concerns of EU institutions.

Digital divides largely contribute to the significant exclusion of deprived social groups and cause substantial negative social consequences. Also, the economic implications of fast-growing digital changes must not be ignored. Research by Abbasabadi and Soleimani (2021) dealt with the link between the expansion of digital technologies and unemployment. The results show a significant correlation between unemployment and digital technology indexes. It is further concluded that as digital technologies expand, unemployment rises to a maximum and begins to decline as technological expansion exceeds a specific value.

Technological progress has conditioned the accelerated growth of the global economy and the automation of many industrial and business processes, consequently affecting education, personal skills, competencies, but also working relationships. Additionally, the emergence of new specialized workplaces and the development of new knowledge and smart products occurred. Vu (2011) emphasizes the importance of human capital for the effective application of ICT because technologies alone do not bring improvements if employees' digital skills are not raised to an adequate level. Digital divides significantly affect the working population especially concerning more mature and older employees. Many pieces of research deal with the changes in the working environment and the employees' adaptation to the new situation. In extensive research on the effects of technological changes on employment made by Mondolo (2022) and Filippi et al. (2023), it was concluded that the impact of ICT incorporation in the working environment on older employees could be negative, positive, or even inconclusive. However, if it is about employees with a higher educational level, especially in digital literacy, who have intensively used ICT in their work, the negative impact of technology on employment is significantly reduced.

Digital literacy (or ICT literacy) refers to the necessary extension of literacy. It is defined as the ability to use information from ICT sources and to develop the skills of using digital devices and critical thinking to assess the value of information and security (Fulton & McGuinness, 2016; Nicholson, 2017). According to UNESCO (2018) definition: "Digital literacy is the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies for employment, decent jobs and entrepreneurship. It includes competencies that are variously referred to as computer literacy, ICT literacy, information literacy and media literacy."

The importance of digital literacy is reflected in the achievement of financial inclusion for older people, given that the ability to perform financial transactions remains an essential element of daily activities and social inclusion (Bui & Luong, 2023). Digital financial literacy represents knowledge about digital financial products and services and awareness of risks and rights (Kumar et al., 2023). Digital financial literacy allows the adequate and simple management of finances and long-term financial stability. The results of the research by Bui and Luong (2023) indicate that financial literacy problems arise as a consequence of the level of education and wealth. Ciesielska et al. (2022) dealt with e-government inclusion policies for seniors, considering the two main drivers of these activities. Namely, technological and social aspects must be evaluated when considering the necessity of adapting services provided through e-government. First, the problem arises because of the older population's coherence with technology and their ability to use it. On the other hand, with aging, the need to use various social services has been increasing, and in recent times they are all offered in digital form. Therefore, the problem of digital inclusion of the older population represents an important field of social policy and a strong challenge for policymakers.

On the other hand, Peng's (2017) study deals with the issue of the effect of computer skills on an employee's workplace and employability. The results indicate that digital literacy reduces the possibility of changing the employee's workplace due to digitization and additionally facilitates reemployment if the employee is transferred. Lee et al. (2022) deal with older employees' productivity and conclude that employees with well-developed ICT skills that they use when performing their work affect positively their wages. This is especially emphasized for those employed whose jobs, besides ICT skills, require a high level of education. Furthermore, the research proves that the decline in productivity accompanying the aging process can be reduced by constantly training employees to improve their digital skills.

Based on the literature review, it can be concluded that age-based digital inequality affects the socio-economic performance of the older population. Furthermore, there is a lack of research in the literature that directly examines the relationship between the level of digital literacy and the level of employment of the older population, which is the focus of this paper.

3. DATA AND METHODOLOGY

3.1. Data

Data from the Eurostat database from 2021 was used to achieve the research goals. The Eurostat database was created through the cooperation of the Statistical Office of the European Union, National Statistical Institutes, and other national authorities in the EU Member States, forming the European Statistical System (ESS). The EU survey on the use of Information and Communication Technologies (ICT) in households and by individuals is conducted annually with the aim of collecting data on the availability and use of ICT. The sample in this study consists of three age levels: 35-44, 45-54, and 54-65, which will be used to test the assumption that digital literacy's impact on employment depends on the age group. The data series on 37 European countries is collected, creating a sample of 111 data lines. A series of statistical analyses are further applied to test the assumption that digital literacy measures influence employment.

3.2. Construction of digital literacy measures

Following the previous definitions of digital literacy, measures in this paper consist of two components: Level of computer skills and Evaluating data, information, and digital content. In addition, the Way obtaining ICT skills was taken as a factor influencing the employment rate. The Level of computer skills measure consists of nine indicators presented in Table 1. Evaluating data, information, and digital content consists of six indicators, while Way obtaining ICT skills consists of five indicators, shown in Table 1.

Table 1. Defined indicators (Eurostat)

Measurement	Indicator	Label
Level of computer skills (LCS)	Individuals who have written code in a programming language (3 months)	CS1
	Individuals who have copied or moved files between folders, devices or on the cloud (3 months)	CS2
	Individuals who downloaded or installed software or apps (3 months)	CS3
	Individuals who changed the settings of software, app or device (3 months)	CS4
	Individuals who used word processing software (3 months)	CS5
	Individuals who have created files integrating elements such as text, pictures, tables, charts, animations or sound (3 months)	CS6
	Individuals who used spreadsheet software (3 months)	CS7
	Individuals who used advanced features of spreadsheet software to organise, analyse, structure or modify data (3 months)	CS8
	Individuals who edited photos, video or audio files (3 months)	CS9
Evaluating data, information and digital content (EDIDC)	Individuals have seen untrue or doubtful information or content on the internet news sites or social media (3 months)	ED1
	Individuals have checked the truthfulness of the information or content they found on the internet news sites or social media (3 months)	ED2
	Individuals have checked the truthfulness of the information or content found on the internet by checking the sources or finding other information on the internet (3 months)	ED3
	Individuals have checked the truthfulness of the information or content found on the internet by following or taking part in discussion on internet regarding the information (3 months)	ED4
	Individuals have checked the truthfulness of the information or content found on the internet by discussing the information offline with other persons or using sources not on internet (3 months)	ED5
	Individuals have checked the truthfulness of the information or content found on the internet (3 months) by using the following methods: I_TICCSFOI, I_TICIDIS or I_TICNIDIS	ED6
Way obtaining ICT skills (WODS)	Individuals carried out free online training	OS1
	Individuals carried out training paid by themselves	OS2
	Individuals carried out free training provided by public programs	OS3
	Individuals carried out training paid or provided by the employer	OS4
	Individuals carried out on-the-job training	OS5

3.3. Methods

Principal Component Analysis (PCA) represents the basis of any multivariate analysis, which purpose is investigating relationships between variables. PCA can be used for simplification, data reduction, modeling, outlier detection, variable selection prediction, etc. (Esbensen & Geladi, 1987). The basic premise of PCA is that certain measures in a data set are more meaningful for explaining a particular phenomenon while others create noise. It is used when the research focuses on the minimum number of factors that describe the maximum share of the total variance represented in the original set of variables (Hair et al., 2014).

PCA was conducted on the entire sample to interpret the aligning of the defined indicators to each measure, explain the variability, and determine the reliability of the proposed measurement scales. Also, regression factor scores were determined for each measure. They represent the distance of every entity's position on the factor(s) (DiStefano et al., 2009). The scores created by the regression method have a mean of 0 and a variance equal to the squared multiple correlations between the estimated factor scores and the actual factor values (IBM, 2021).

In the continuation of the analysis, the obtained factor scores were used in the multiple regression analysis. The employment rate in certain age groups was used as a dependent variable (data retrieved from Eurostat, Labor force survey), while factor scores for three digital literacy measures were used as independent variables. In order to determine the influence but also the existence of differences based on age groups, three models were defined and tested.

The basic model of the regression equation for predicting the effect of the examined variables on the employment rate has the form:

Employment rate= b0+b1· *Level of computer skills* + b2· *Evaluating data, information and digital content* + b3· *Way obtaining ICT skills*

4. RESULTS

The summary statistic of the examined variables is presented in Table 2. The results of PCA and the reliability of measurement scales are also shown in Table 2. The results indicate that the collected data are adequate for conducting factor analysis, considering that all Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO test) values exceed the recommended threshold value of .6. Furthermore, high % of variance explained values indicate a high share of explained changes with examined variables. In addition, high values of factor loadings give considerable weight to the selected factors. Finally, the reliability of the measurement scales was confirmed by Cronbach's Alpha coefficient, whose values exceed the recommended values of .7.

Table 2. Statistics of the examined variables

Measurement	Label	Min	Max	Mean	Std. Deviation	KMO Test	% of variance explained*	Factor loadings	Cronbach's Alpha
Level of computer skills	CS1	.13	13.45	4.40	3.33	.894	81.960	.830-.959	.960
	CS2	4.46	97.01	54.84	19.30				
	CS3	9.62	85.04	45.98	19.17				
	CS4	1.36	68.50	32.19	17.24				
	CS5	2.96	83.78	48.22	19.18				
	CS6	2.02	70.40	34.38	16.29				
	CS7	.73	84.37	37.33	18.09				
	CS8	.64	57.71	20.15	12.43				
	CS9	1.37	63.21	26.95	14.15				
Evaluating data, information and digital content	ED1	9.36	81.29	47.03	15.62	.858	82.917	.727-.975	.940
	ED2	2.22	51.27	21.34	10.59				
	ED3	1.92	48.87	18.54	10.32				
	ED4	.64	38.84	6.95	5.92				
	ED5	.64	38.84	10.53	7.13				
	ED6	2.22	50.49	20.84	10.37				
Way obtaining ICT skills	OS1	.33	49.02	11.68	8.49	.643	69.193	.683-.941	.806
	OS2	.00	12.02	2.38	2.22				
	OS3	.12	10.71	2.74	2.29				
	OS4	.48	36.76	9.59	8.64				
	OS5	.70	53.54	12.16	10.63				

*variance based on Eigenvalues

Based on the values of factor loadings as part of PCA, factor scores were obtained for each examined element in the sample, and these values were further used in the regression analysis.

Multiple regression analysis with three independent variables was conducted on three models considering different age groups. In Model I, where the 55-64 age group was taken as the selection variable, the results indicate that the model explained 32.8% of the variability of the dependent variable, i.e., the employment rate of this age group. The values of F=4.391 and Sig=.012< .05 show the significance of explaining this variability, presented in Table 3. On the other hand, when considering the results of Models II and III for the age categories 45-54 and 35-44, respectively, it can be concluded that there is no statistically significant influence of the level of digital literacy on the employment rate in these cases.

Table 3. Statistics of the examined variables

	Model I	Model II	Model III
Age	55-64	45-54	35-44
R^2	.328	.092	.079
F	4.391	.913	.774
Sig	.012	.448	.519

The linear regression equation for Model I has the form:

Employment rate=62.918-1.246· *Level of computer skills* +1.059· *Evaluating data, information and digital content* +5.799· *Way obtaining ICT skills*

Through further analysis, considering the t values and the corresponding significance of the examined independent variables in Model I, it can be concluded that the Way obtaining ICT skills is the only influential factor (t=2.474 and Sig=.02 <.05), which is not the case for the remaining two factors Level of computer skills, and Evaluating data, information and digital content, Table 4.

Table 4. Results of multiple regression analysis

Model 1	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	62.918	2.240		28.084	.000
Level of computer skills	-1.246	4.996	-.084	-.249	.805
Evaluating data, information and digital content	1.059	4.223	.070	.251	.804
Way obtaining ICT skills	5.799	2.344	.591	2.474	.020

The obtained results provide a positive answer to the question of the impact of digital literacy on the employment rate of the elderly population. Also, it is evident that there is a difference in how digital literacy affects employability in different age groups.

5. DISCUSSION AND CONCLUSION

Significant demographic changes affecting all parts of the planet have been accelerating in recent decades, whether it is pronounced migration, changes in the birth rate, or population aging. All these changes posed to policymakers and business decision-makers the necessity of adopting new policies and strategies. Recent trends emerging in the working environment are

especially important for an aging workforce. Therefore the future of older workers must be analyzed in the context of digital changes. This paper analyzes the impact of digital literacy on the employment rate of older workers. The results indicate that the employment rate of the population belonging to the age group 55-64 depends on the level of digital literacy. The main point of influence of digital literacy is the Way obtaining ICT skills, while the remaining two factors, Level of computer skills and Evaluating data, information and digital content, do not have a statistically significant influence. By checking the influence of the same factors on the employment rates in the age groups 35-44 and 45-54, it is observed that there is no statistically significant influence of digital literacy. The obtained results are consistent with the findings of Peng (2017), Mondolo (2022), and Bui and Luong (2023), which confirm the existence of a digital age gap in many parts of the world, as well as the impact of this gap on the employment rate of the older population.

The results of previous research indicate that the reduction of older population disadvantages caused by ICT is significantly influenced by educational level. Therefore, the older population should be encouraged and empowered to increase digital literacy daily through various training (Bui & Luong, 2023). In the results of this research, a significant positive influence of the factor related to the acquisition of ICT skills through various types of training, whether provided by employers or independently undertaken by older employees, can be observed.

In the short term, ICT development can have a negative impact on the employment rate of the older population. The reasons are the need to acquire new skills and the stereotypes that older people face that their performance declines, that they are less flexible and adaptable, and that they are more difficult to train (Lissitsa et al., 2017). However, in the long term, employers' failure to deal with older employees can mean missing out on the benefits that employees with valuable work experience bring with them who have proven their values and loyalty to the company (Lam et al., 2012). Therefore, learning is considered a key element in an aging society, where the diversity of needs of the older population must be considered. Consequently, it is necessary to enable older people to learn new skills and develop such products and resources that facilitate the use of ICT. In addition to developing adequate technological solutions, it is also necessary to create appropriate policies to support the older population, thereby significantly improving their quality of life.

The limitation of the research is that the sample was selected at the state level, while for more detailed analysis, the impact of digital literacy should be observed at the personal level from the aspect of gender, education, and other demographic characteristics, which requires future quantitative research.

ACKNOWLEDGMENT

The authors want to thank COST Action CA21107 - Work inequalities in later life redefined by digitalization (DIGI-net) for support to this research.

REFERENCES

Abbasabadi, H. M., & Soleimani, M. (2021). Examining the effects of digital technology expansion on Unemployment: A cross-sectional investigation. Technology in Society, 64, 101495.

Bui, M. T., & Luong, T. N. O. (2023). Financial inclusion for the elderly in Thailand and the role of information communication technology. Borsa Istanbul Review, in press.

Ciesielska, M., Rizun, N., & Chabik, J. (2022). Assessment of E-government inclusion policies toward seniors: A framework and case study. Telecommunications Policy, 46(7), 102316.

DiStefano, C., Zhu, M., & Mîndrilã, D. (2009). Understanding and Using Factor Scores: Considerations for the Applied Researcher. Practical Assessment, Research, and Evaluation, 14, 20.

Esbensen, K., & Geladi, P. (1987). Principal component analysis. Chemometrics and Intelligent Laboratory Systems, 2(1-3), 37-52.

Eurostat (2023, April 4). Eurostat. Retrieved from European Commission: https://ec.europa.eu/eurostat/data/database

Filippi, E., Bannò, M., & Trento, S. (2023). Automation technologies and their impact on employment: A review, synthesis and future research agenda. Technological Forecasting and Social Change, 191, 122448.

Finnish Centre for Pensions (2023). Retirement Ages. Retrieved from: https://www.etk.fi/en/work-and-pensions-abroad/international-comparisons/retirement-ages/

Fulton, C., & McGuinness, C. (2016). Your Learning in a Digital World. Editor(s): Crystal Fulton, Claire McGuinness Digital Detectives, Chandos Publishing 9-17.

Galperin, H., & Arcidiacono, M. (2021). Employment and the gender digital divide in Latin America: A decomposition analysis. Telecommunications Policy, 45(7), 102166.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson R.E. (2014). Multivariate Data Analysis (Seventh Edition). Pearson Education Limited, Harlow, England and Associated Companies throughout the world.

IBM (2021). Factor Analysis Scores. Retrieved from: https://www.ibm.com/docs/en/spss-statistics/25.0.0?topic=analysis-factor-scores

Kumar, P., Pillai, R., Kumar, N., & Tabash, M. I. (2023). The interplay of skills, digital financial literacy, capability, and autonomy in financial decision making and well-being. Borsa Istanbul Review, 23(1), 169-183.

Lam, S. S., Ng, T. W., & Feldman, D. C. (2012). The relationship between external job mobility and salary attainment across career stages. Journal of Vocational Behavior, 80(1), 129-136.

Lee, J., Kwak, D. W., & Song, E. (2022). Can older workers stay productive? The role of ICT skills and training. Journal of Asian Economics, 79, 101438.

Lissitsa, S., Chachashvili-Bolotin, S., & Bokek-Cohen, Y. (2017). Digital skills and extrinsic rewards in late career. Technology in Society, 51, 46-55.

Lucendo Monedero, Á. L., Ruiz Rodríguez, F. y González Relaño, R. M. (2019). Measuring the digital divide at regional level. A spatial analysis of the inequalities in digital development of households and individuals in Europe. Telematics and Informatics, 41, 197-217.

Mayer, W., Madden, G., & Wu, C. (2020). Broadband andeconomic growth: a reassessment 26, Information Technology for Development, 128–145.

Mondolo, J. (2022). The composite link between technological change and employment: A survey of the literature. Journal of Economic Surveys, 36, 1027– 1068.

Nicholson, K. (2017). Objectives and actions. Ed. Kirstie Nicholson. Innovation in Public Libraries. Chandos Publishing. 127-135.

Olejniczak, A. (2022). The usage of Instagram app on the example of young consumers of the Generation Z. Serbian Journal of Management, 17(2), 351-360.

Peng, G. (2017). Do computer skills affect worker employment? An empirical study from CPS surveys. Computers in Human Behavior, 74, 26-34.

Picatoste, J., Pérez-Ortiz, L., & Ruesga-Benito, S. M. (2018). A new educational pattern in response to new technologies and sustainable development. Enlightening ICT skills for youth employability in the European Union. Telematics and Informatics, 35(4), 1031-1038.

Sallati, C., & Schützer, K. (2021). Development of smart products for elders within the Industry 4.0 context: A conceptual framework. Procedia CIRP, 100, 810-815.

UNESCO Institute for Statistics (2018). A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2. UNESCO Institute for Statistics, Succursale Centre-Ville Montreal, Quebec, Canada.

United Nations Department of Economic and Social Affairs, Population Division (2022). World Population Prospects 2022: Summary of Results. UN DESA/POP/2022/TR/NO. 3.

Vu, KM (2011). ICT as a source of economic growth in the information age: empirical evidence from the 1996-2005 period, Telecommunication Policy, 35, 357–372.

Wirthman, L. (2020). How Tech-Savvy Milenials Are Driving the digital Workforce. Available at: https://www.dell.com/fr-fr/perspectives/how-tech-savvy-millennials-are-driving-the-digital-workplace/

Zilian, S. S., & Zilian, L. S. (2020). Digital inequality in Austria: Empirical evidence from the survey of the OECD "Programme for the International Assessment of Adult Competencies". Technology in Society, 63, 101397.

Volume XIX, Issue (1) (2023) 301-308

International May Conference on Strategic Management

EXCAVATOR'S AND BULLDOZER'S DOWNTIME COMPARISON AND RISK MANAGEMENT: PRELIMINARY STUDY

Vesna Spasojević Brkić[1*], Aleksandar Brkić[2], Martina Perišić[1], Mirjana Misita[1], Nemanja Janev[1]

[1] University of Belgrade - Faculty of Mechanical Engineering, Belgrade, Serbia; [2] Innovation Center of Faculty of Mechanical Engineering, Belgrade, Serbia

Abstract: Risk management of engineering systems is of vital importance, but very often there is no enough data to quantitatively evaluate risk and accordingly create risk management strategy. Proper maintenance of excavators and bulldozers maximizes fuel efficiency and reduces operating costs, as well as reduces equipment failure and enhances safety. Accordingly, previous research opens avenue to analyze these two machinery types when working in mining industry. This paper aims to create statistical comparisons on data collected about excavators' and bulldozers' as technological failure/stoppage, electrical failure/stoppage, mechanical failure/stoppage, misuse, organizational failure/stoppage and external cause of failure/stoppage. After performing descriptive statistics, hypothesis testing has not found significant differences between technological failures/stoppages of excavators vs. bulldozers, mechanical failures/stoppages between already mentioned machines or theirs hazard degrees or total downtimes. Further research focus should be directed to the sample enlargement and further analysis, which is expected to prove preliminary results.

Keywords: excavator, bulldozer, downtime, differences

1. INTRODUCTION

To fully profit from mechanization, mining machinery should be used continuously. One particular issue is the length of its downtime and their effect on mining process productivity, while another is its influence on safety (Edwards & Yisa, 2001; Seo & Kim, 2008). Mining sites managers should create appropriate contingency plans to lessen the effect of downtime if they could predict how long a site would be offline (Edwards & Yisa, 2001).

In order to properly plan the prevention of critical potentials of downtime and to prepare a response strategy in the case of failure with the goal of avoiding consequences, risk management is a requirement (Kumar & Kumar, 2016). As its prerequisite, the proper record keeping is a crucial component of all mining equipment maintenance, but it is rarely done in reality even though it is a requirement for effective risk management (Spasojević Brkić et al., 2022a).

Accordingly, further attention on those issues is nowadays requirement, as in previous research, which follows.

[*] *Corresponding author: vspasojevicbrkic@gmail.com*

2. PREVIOUS RESEARCH

The operation of any heavy machinery is associated with high risks, while the goal of risk management is to create a controlled work environment to ensure the safe operation of the high-risk systems (Bedi et al., 2021; Kirin et al., 2021). The risks associated with heavy machinery are influenced by the working environment, machine specification, mine design, and human factor, while most rarely focus is given to excavators and bulldozers (Duarte et al., 2021). It is also recommended to focus on active monitoring, in both equipment operations and maintenance (Berriault et al., 2017) and to pay more attention to ergonomic inconveniences in heavy mobile machinery cabs (Spasojević Brkić et al., 2023).

Although rarely, previous researchers have theorized and demonstrated that operation of excavators and bulldozers on mining sites has high risks (Zhang et al., 2006; Horberry et al., 2016; Rane et al., 2019; Brkić et al., 2022; Spasojević Brkić et al., 2022a).

Till now, there have been numerous attempts to understand underlying causes of injury incidents on mining equipment, but available studies very rarely analyse and usually do not systematically collect data on downtime types frequencies and its consequences, although those data are needed to calculate risk and later on create strategies to mitigate them. Most frequently authors base their research on qualitative data and use different types of FMEA - Failure Modes and Effects Analysis. Examples of such research are given in surveys such as Karasan et al. (2018), Kumar and Kumar, (2016), Misita et al. (2021) and Zeng et al. (2020). In contrast to FMEA analysis and the Fine Kinney approaches, a novel strategy proposed by Karasan et al. (2018), called analysis of safety and critical effects expanded by Pythagorean fuzzy sets, produced more accurate results. A new risk management strategy system for the program for optimal excavator maintenance has been proposed, which includes the functional analysis methods of FMEA and FMECA and aims to develop an effective methodology for excavator maintenance that reduces maintenance costs while effectively monitoring and maintaining technical constraints (Kumar & Kumar, 2016). The Fuzzy FMEA method was also used in a study that tracked hydraulic excavators' downtime over a year to determine the most important causes of downtime, i.e. risk selection (Misita et al., 2021). Using data from excavator failures, a reliability analysis and an FMEA analysis were carried out, which were then used to develop proper maintenance policies (Zeng et al., 2020). Evidently, more research is available about excavators, and very rarely data about downtime even there is collected, so risk calculation is mostly qualitative, although risk are expected to be high. One of rare research which is based on bulldozers' downtime is given in Spasojević-Brkić et al. (2022b), where authors have found that from the aspect of the risk of failure, the most frequent failures are heating repair, oil change, bulldozer cleaning, screw replacement, tonsil adjustment, filter replacement, part repairment, hose replacement, and bearing replacement.

3. METHODOLOGY

Previous research opens avenue to pay further attention to risk mitigation when managing operation of excavators and bulldozers.

This paper aims to create statistical comparisons on data collected about excavators' and bulldozers' downtime and based on these conclusions to arrive to conclusions about possible risk mitigation strategies.

Data collection is conducted on 6 mining sites in Serbia and Montenegro during a period of 18 months. Downtimes of both mining machinery types have been classified as technological failure/stoppage, electrical failure/stoppage, mechanical failure/stoppage, misuse, organizational failure/stoppage and external cause of failure/stoppage. Data were also

collected on the type and number of failures of mining machinery as well as their duration, and based on that, the frequency of failure duration and the hazard degree were obtained. After descriptive statistics done, hypothesis testing done to elaborate of there are significant differences between downtimes recorded on those machinery types with aim check if similar strategies could be applied to both machinery types. If there differences would not be found the conclusion led would be that it is possible to use joint or available data and apply risk mitigation strategies on those basis.

3.1. Descriptive statistics

Table 2. shows data of descriptive statistics, according to the nomenclature in table 1.

Table 1. Nomenclature

Abbreviation	Meaning
EX-T	Excavator - technological failure/stoppage
EX-E	Excavator - electrical failure/stoppage
EX-Mc	Excavator - mechanical failure/stoppage
EX-Mu	Excavator – misuse
EX-O	Excavator - organizational failure/stoppage
EX-Ex	Excavator - external cause of failure/stoppage
EX-HD	Excavator - hazard degree
EX-TD	Excavator - total downtime
BU-T	Bulldozer - technological failure/stoppage
BU-E	Bulldozer - electrical failure/stoppage
BU-Mc	Bulldozer - mechanical failure/stoppage
BU-Mu	Bulldozer – misuse
BU-O	Bulldozer - organizational failure/stoppage
BU-Ex	Bulldozer - external cause of failure/stoppage
BU-HD	Bulldozer - hazard degree
BU-TD	Bulldozer - total downtime
N	enrollment number
n.e.	not examined (insuficient number of data 0-3)
Mp	mid point
Me	median
Min	minimum
Max	maximum
R	range
Sd	standard deviation
Cv(%)	coefficient of variation
U*	u* - Mann Withney
p - level	p sample level
VR	significance of comparison
i.d.	statistically insignificant difference
$p<0.05$	statistically significant difference
$p<0.01$	statistically highly significant difference
$p<0.001$	statistically absolutely significant difference

Table 2. Descriptive statistics

	N	Mp	Me	Min	Max	R	Sd	Cv(%)
EX-T	53	34.057	30.0	10	180	170	30.525	89.63
EX-E	3	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
EX-Mc	112	84.866	30.0	5	1200	1195	149.443	176.09
EX-Mu	0	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
EX-O	0	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
EX-Ex	1	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
EX-HD	169	1.716	1.0	1	5	4	1.221	71.14
EX-TD	169	75.917	30.0	5	1200	1195	136.232	179.45
BU-T	26	30.385	30.0	15	80	65	13.261	43.64
BU-E	0	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
BU-Mc	74	76.622	60.0	5	350	345	77.265	100.84
BU-Mu	0	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
BU-O	0	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
BU-Ex	0	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
BU-HD	102	1.980	2.0	1	5	4	1.169	59.02
BU-TD	102	64.216	30.0	5	350	345	69.120	107.64

Given that the coefficients of variation are far greater than 30%, the comparison was made using the Mann-Withney U* test and the results are shown in Table 3.

A scatterplot between the hazard degree and the failure/stoppage time of the excavators is shown in Figure 1, while the histograms for the hazard degree and the downtime/failure are shown in Figure 2 and 3 respectively.

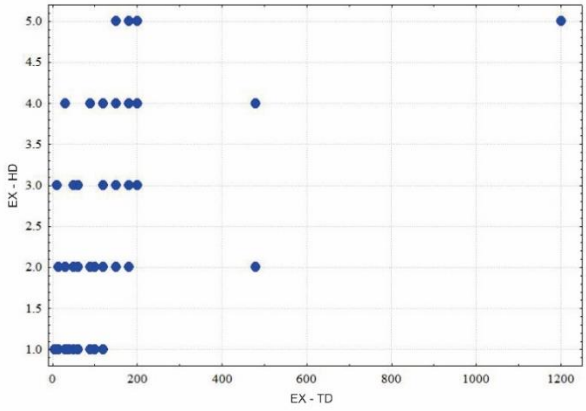


Figure 1. Scatterplot between hazard degree and the failure/stoppage time of the excavators

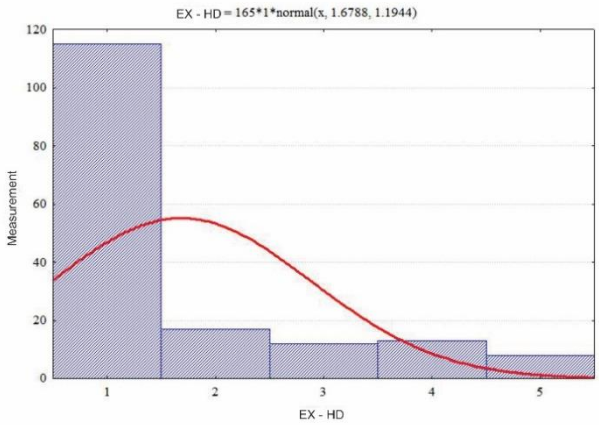


Figure 2. Histogram of hazard degrees for excavators

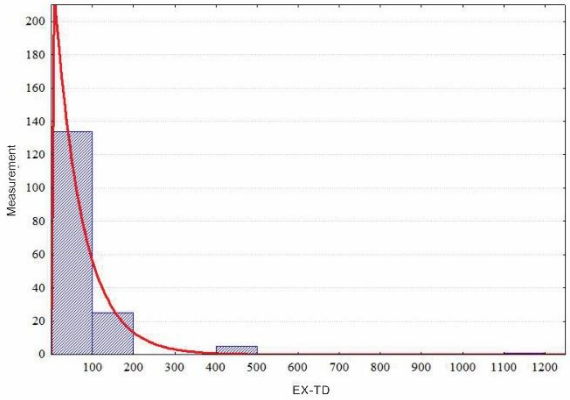


Figure 3. Histograms for failure/stoppage time of excavators

A scatterplot between the hazard degree and the failure/stoppage time of the bulldozers are shown in Figure 4, while the histogram for hazard degree is shown in Figure 5 and for downtime/failure times in Figure 6, according to Spasojević-Brkić et al. (2022b).

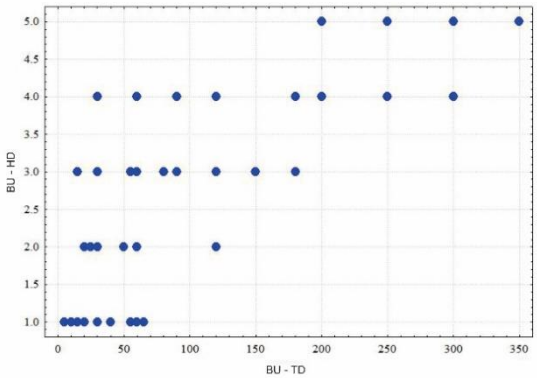


Figure 4. Scatterplot between hazard degree and the failure/stoppage time of the bulldozers

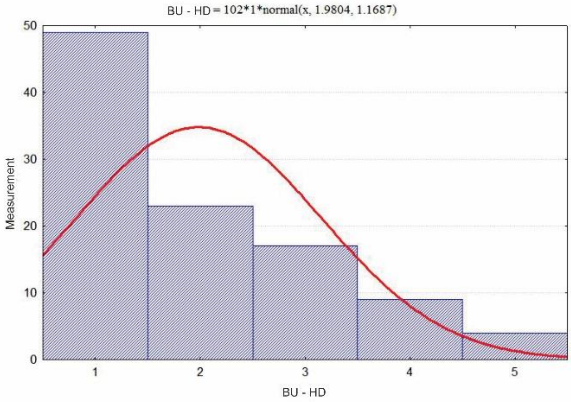


Figure 5. Histogram of hazard degrees for bulldozers

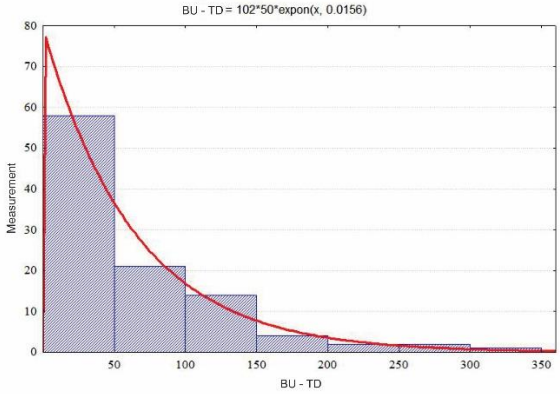


Figure 6. Histograms for failure/stoppage time of bulldozers

Table 3. Comparison of failure/stoppage parameters with U* by Mann-Whitney test

			U*	p - level	VR
EX-T	vs.	BU-T	0.000000	1.000000	i.d.
EX-Mc	vs.	BU-Mc	0.000000	1.000000	i.d.
EX-HD	vs.	BU-HD	0.540062	0.589155	i.d.
EX-TD	vs.	EX-TD	0.000000	1.000000	i.d.

The comparisons in Table 3 show that there are no statistically significant differences regarding the data we have in this preliminary research, and the differences are evidently the greatest in terms of the hazard degree between the compared machines.

4. CONCLUSIONS

Previous study suggests that more attention should be paid to risk mitigation when operating excavators and bulldozers. This paper aimed to make statistical comparisons based on data gathered about excavator and bulldozer downtime, and then drawn conclusions about possible risk mitigation strategies based on those findings. Following the completion of descriptive statistics, hypothesis testing was performed to determine whether there are significant differences in downtimes recorded on those machinery types, with the goal of determining whether comparable strategies could be applied to both machinery types.

The Mann-Whitney U* test results revealed that there was no statistically significant difference in the failure/stoppages between the machines ($p > 0.05$). This suggests that, with additional research, the same risk management strategy could be applied to both types of mining machinery.

The disadvantage of the work is the small sample, in which not all types are represented downtime (technological failure/stoppage, electrical failure/stoppage, mechanical failure/stoppage, misuse, organizational failure/stoppage and external cause of failure/stoppage) and therefore we consider it a preliminary analysis.

Further research focus should be directed to sample enlargement and further analysis, which is expected to prove preliminary results.

ACKNOWLEDGEMENT

This research was supported by the Science Fund of the Republic of Serbia, #GRANT No. 5151, Support Systems for Smart, Ergonomic and Sustainable Mining Machinery Workplaces – SmartMiner and the Ministry of Science, Technological Development and Innovations contract no. 451-03-47/2023-01/200105 from 03.02.2023.

REFERENCES

Bedi, J. K., Rahman, R. A., & Din, Z. (2021). Heavy Machinery Operators: Necessary Competencies to Reduce Construction Accidents. IOP Conference Series: Earth and Environmental Science, 641(1), 012007.

Berriault, C. J., Lightfoot, N. E., Seilkop, S. K., & Conard, B. R. (2017). Injury mortality in a cohort of mining, smelting, and refining workers in Ontario. Archives of Environmental & Occupational Health, 72(4), 220–230.

Brkić, A., Misita, M., Spasojević Brkić, V., Papić, N., & Perišić, M. (2022). Identification and analysis of the risk of down time in the operational work of bulldozers. 13th DQM International Conference Life Cycle Engineering and Management DQM-POLYTECH-2022 : Proceedings, June 23-24, 2022, Prijevor, Serbia.

Duarte, J., Marques, A. T., & Santos Baptista, J. (2021). Occupational Accidents Related to Heavy Machinery: A Systematic Review. Safety, 7(1), 21.

Edwards, D. J., & Yisa, S. (2001). Modelling the magnitude of plant downtime: A tool for improving plant operations management. Engineering, Construction and Architectural Management, 8(3), 225–232.

Horberry, T., Burgess-Limerick, R., Cooke, T., & Steiner, L. (2016). Improving Mining Equipment Safety Through Human-Centered Design. Ergonomics in Design, 24(3), 29–34.

Karasan, A., Ilbahar, E., Cebi, S., & Kahraman, C. (2018). A new risk assessment approach: Safety and Critical Effect Analysis (SCEA) and its extension with Pythagorean fuzzy sets. Safety Science, 108, 173–187.

Kirin, S., Sedmak, A., Li, W., Brzaković, M., Miljanović, I., Petrović, A., & Sedmak, S. (2021). Human factor risk management procedures applied in the case of open pit mine. Engineering Failure Analysis, 126, 105456.

Kumar, P., & Kumar, A. (2016). Methods for Risk Management of Mining Excavator through FMEA and FMECA. The International Journal Of Engineering And Science (IJES), 5, 57–63.

Misita, M., Spasojević Brkić, V., Perišić, M., Brkić, A., Papić, N., & Damjanović, M. (2021). Research on risk prioritization at hydraulic excavator using fuzzy FMEA method. 12th International Conference Life Cycle Engineering and Management ICDQM-2021 : Proceedings, June 24-25, 2021, Prijevor, Serbia.

Rane, S. B., Potdar, P. R., & Rane, S. (2019). Development of Project Risk Management framework based on Industry 4.0 technologies. Benchmarking: An International Journal, 28(5), 1451–1481.

Seo, J.M., & Kim, S.K. (2008). The Study on Measures for Reducing Safety Accidents of Excavator. Journal of the Korea Institute of Building Construction, 8(3), 127–133.

Spasojević Brkić, V., Misita, M., Brkić, A., Veljković, Z., Perišić, M., Papić, N., & Janev, N. (2022a). Risk Management and Excavator Downtime Analysis. 12th International Symposium Engineering Management and Competitiveness 2022 (EMC 2022), 98–105.

Spasojević Brkić, V., Misita, M., Perišić, M., Brkić, A., & Veljković, Z. (2023). Validating Measurement Structure of Checklist for Evaluating Ergonomics Risks in Heavy Mobile Machinery Cabs. Mathematics, 11(1), 1-11.

Spasojević-Brkić, V. K., Perišić, M., Veljković, Z., Misita, M., & Damjanović, M. (2022b). Pareto analysis in bulldozer's failures and stoppages risk management. Industrija, 50(2), 37-49.

Zeng, Q., Liu, W., Wan, L., Wang, C., & Gao, K. (2020). Maintenance Strategy Based on Reliability Analysis and FMEA: A Case Study for Hydraulic Cylinders of Traditional Excavators with ERRS. Mathematical Problems in Engineering, 2020, 1–11.

Zhang, R., Yu, D., Li, X., Yao, X., & Liu, Y. (2006). Surface Mine System Simulation and Safety Risk Management. Journal of China University of Mining and Technology, 16(4), 413–415.

Volume XIX, Issue (1) (2023) 309-321

International May Conference on Strategic Management

EVALUATION OF WEBSITE QUALITY OF NATIONAL PARKS IN SERBIA USING AN INTEGRATED AHP-VIKOR METHODOLOGY

Sanela Arsić*, Đorđe Nikolić, Milena Gajić, Isidora Milošević, Anđelka Stojanović

University of Belgrade, Technical Faculty in Bor, Serbia

Abstract: Due to their widespread use, the Internet and websites are effective tools that can be used to educate local residents and tourists about the function of protected areas and national parks, their ecological importance, visitor restrictions, and ecotourism activities, as well as to inform and raising awareness about the importance and preservation of the same. In today's competitive environment, evaluating the website quality of the national park and its comparison with other competitive organizations is an important issue for visitors, the local community, and other stakeholders. Therefore, the aim of this paper is to assess and contrast the website quality of National Parks in Serbia using a multi-criteria decision-making model based on Analytic Hierarchy Process (AHP) and VIKOR (Vlse Kriterijumska Optimizacija Kompromisno Resenje) method. The assessment performed in this study can help decision-makers in protected nature areas to frame long-term promotion policies directed at competitiveness.

Keywords: national parks, website evaluation, AHP method, VIKOR method

1. INTRODUCTION

The Internet is a network that connects numerous computer networks and thus provides multiple users with fast access to information (Dreyfus, 2008). The advantages of the Internet and the World Wide Web were quickly recognized by companies operating in a competitive environment. Later, other companies, organizations, and even individuals recognized the advantages of having a presence on the Internet- the advantages that can be realized by having your own website (Glukhov et al., 2015).

When it comes to the role of a website in the business of companies, it is possible to identify different parts of websites that affect the business of organizations, which range from providing basic information to website visitors to providing customized information and support to website visitors, with the aim that they retain and even acquire new potential visitors, i.e., customers (Simoes et al., 2015; Rivera-Trigueros et al., 2022; Bergmann et al., 2023).

The recent rises of new knowledge, rapid environmental changes, and the increasing use of information and communication technologies have significantly changed all aspects of life. Nowadays, modern organizations communicate with users via the Internet, mainly to promote their products and services (Hernández et al., 2009). As a result, almost all organizations today are present on the Internet and promote their products and services through the Internet and web presentations.

* *Corresponding author: saarsic@tfbor.bg.ac.rs*

A web presence can help organizations gain an edge over their competitors. However, having a website cannot automatically provide a competitive advantage. One important question arises: "How well does a website meet the demands of its users, and how to measure its quality?". For example, websites belonging to hotels and organizations from popular tourist destinations often rank high in Internet searches and have many visitors. In addition, website visitors already have a preconceived opinion about a certain quality of services and content on those sites.

In contrast, web presentations belonging to hotels and organizations with lesser-known tourist destinations, such as national parks, are often ranked worse in Internet searches, which is to be expected because they have fewer visitors (Vyas, 2019). Therefore, the quality of web presentations of such websites becomes much more important (Lee & Kozar, 2006). Such web presentations should attract and retain the attention of their visitors long enough for them to become familiar with the tourist potential and the quality of services they can get at those destinations.

Therefore, the subject of this research is the examination of the possibility of applying a website in order to better competitive positioning and attract a more significant number of users (especially foreign tourists) in National parks as tourist destinations in Serbia. In this paper, the websites of four national parks in Serbia will be evaluated to see whether they fulfill their purpose, i.e., whether they are designed according to the needs of their visitors or were created with the aim of passive presence on the Internet. In addition, this paper aims to define a set of basic criteria for evaluating websites of tourist organizations and indicate the applicability of multi-criteria decision-making methods in evaluating websites. Additionally, a scientific description of the application of the proposed multi-criteria model AHP-VIKOR will enable managers in national parks to analyse the quality of website and compare them with competitors in order to improve the quality of their web presentations, achieve a competitive advantage, and attract more visitors, especially foreign tourists.

2. THE CONCEPTS OF WEBSITE EVALUATION

Choosing an appropriate set of evaluation criteria is a very important step for successfully solving any multi-criteria problem (Vyas, 2019). Reviewing the literature that primarily considers the evaluation of the quality of websites, it is noticeable that the criteria differ from author to author, that is, in some cases, the criteria overlap, while in some cases, the difference is evident.

Websites can significantly help in gaining an advantage over the competition. However, the mere existence of a website does not automatically ensure the achievement of a competitive advantage (Hu et al., 2019). Therefore, the following two questions arise: „How well does the website really satisfy the needs of website visitors?" and „How to measure the level of satisfaction of their needs, i.e. website quality?".

In the literature, numerous studies and papers were devoted to evaluating the quality of websites (Shehu et al., 2021; Ng et al., 2021). Boyd Collins developed the first formal approach to website evaluation in 1995. His model, intended for librarians, is based on six criteria, created by extracting the criteria designed for printed media (newspapers, magazines, etc.) while respecting the specificity of websites (Merwe & Bekker, 2003). Those criteria are content and quality of information on the website, evidence of the website's owner, website organization, the possibility of searching the website, graphic design, and innovation use. Further, some studies focused on the evaluation of travel-related websites (Bronner & de Hoog, 2016; Agag & El-Masry, 2017; Huang & Mou, 2021), government websites (Lee-Geiller & Lee, 2019;

Puron-Cid et al., 2022), e-learning and education websites (Thowfeek et al., 2014; Garg, 2017; Acosta-Vargas et al., 2018; Gong et al., 2021).

Studies aimed at identifying key criteria for evaluation and/or their importance are still current. For example, Dumitrache (2010) provided an overview of the criteria used to evaluate e-commerce sites. It mentions navigation, response time/website loading time, personalization, and various types of communication with sellers, including telepresence and security, as very important criteria. In addition, Davidavičienė and Tolvaišas (2011) identified a list of criteria for determining the quality of e-commerce sites. They have also provided a summary of what various authors have proposed in the past. The applied criteria were easy to use, navigation, security of transactions and security assurance, and timely help/real-time (Davidavičienė & Tolvaišas, 2011). Additionally, they considered the design, as many other authors such as Cyr, (2013), Garett et al. (2016), Dianat et al. (2019), and Cohen et al. (2021). Zafiropoulos and Vrana (2006), based on the research of websites of hotels, identified six dimensions, that is, criteria, which are relevant for measuring the quality of hotel websites. These criteria are facilities information, guest contact information, reservation and price information, surrounding area information, management of the website, and company profile. In addition, for these criteria, they identified several sub-criteria.

Also, the notion of usability is closely linked to the concept of website quality, which is considered in this paper (Nathan & Yeow, 2011). Usability has been defined and measured in many different ways (Tsai et al., 2010). According to the International Organisation for Standardization (ISO) usability is defined as „the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use“ (ISO, 1998). Nielsen (1994) proposed that usability has five attributes: learnability, efficiency, memorability, low error rate or easy error recovery, and satisfaction. He also suggested that „usability is a quality attribute that assesses how easy user interfaces are to use“ (Nielsen, 2012). Nielsen (2012) extended information system design principles for the Web and suggested four parameters for usability: navigation, content, response time, and credibility. Web usability was defined by Hassan and Li (2005) as consistencies in screen appearance, accessibility, navigation, media use, interactivity, and content. Kim and Kim (2008) identified four usability criteria: satisfaction, usefulness, supportiveness, and effectiveness. Conversely, Tarafdar and Zhang (2005) proposed that website availability, information content, and navigational simplicity all improve website usability. Also, five web usability factors, such as navigation, customization and personalization, download speed, accessibility, and ease of use, were examined by Pearson et al. (2007). They stated that the most crucial criterion is the ease of use. Agarwal and Venkatesh (2002) utilized the Microsoft Usability Guidelines to define website usability through five categories (content, ease of use, made-for-the-medium, promotion, and emotion), while Palmer (2002) defined usability based on five basic design elements extracted from usability and design as well as media richness literature (navigability, interactivity, content, responsiveness, and download delay).

2.1. Identification of criteria for website evaluation

The existence of a greater number of criteria in multi-criteria decision-making undoubtedly leads to a more precise evaluation of alternatives. However, a larger number of criteria also leads to the formation of complex models that may be too complex for ordinary respondents. For this reason, and based on previously researched literature, and experts that participated in this research, the set of criteria for evaluating web presentations of National Parks in Serbia is given in Table 1. These criteria refer to the Visual Design (C_1), Structure and Navigability (C_2), Content (C_3), Innovations (C_4), Personalization (C_5), and Update (C_6).

Table 1. Criteria for evaluating web presentations of National Parks

ID	Criteria
C_1	Visual Design
C_2	Structure and Navigability
C_3	Content
C_4	Innovations
C_5	Personalization
C_6	Update

The meaning of the aforementioned criteria is as follows:

Visual design - The visual design criterion refers to the appearance of the website pages, with a special emphasis on the first page of the web presentation (home page), because it is very important to keep the attention of users who access the site for the first time. This criterion is complex because it includes an adequate selection and arrangement of text and graphic elements on the website pages with the aim of providing visitors with an attractive appearance (Valizadeh-Haghi et al., 2017; Hartono & Holsapple, 2019).

Structure and navigability - It was mentioned earlier that it is important for website visitors to find the information they are interested in quickly. Therefore, a well-designed and organized website should provide the visitor to easily navigate around the site, easily return to the home page of the site, and easy to find relevant information (Valizadeh-Haghi et al., 2017).

Content - This criterion refers to the information needed by website visitors, their organization, and up-to-dateness. Evidence of the time of updating the website's web pages is especially important on the pages where information about manifestations and events is published (Thongpapanl & Ashraf, 2011).

Innovations - The Web is a very current field, subject to frequent changes and the introduction and application of new technologies. Companies and organizations that want to maintain their position in the market must adapt their websites because this proves they are actively using websites to meet their visitors' needs. In contrast, applying new trends and technologies is not so important for companies that are only passively present on the Internet (Rezaeean et al., 2012).

Personalization - Personalization, or adaptation of a website to visitors' needs, can be vital for gaining and maintaining visitors' trust. For example, the ability to change the language in which the text is displayed or display web pages on mobile devices adequately indicates to visitors that these companies or organizations take care of their users (Thongpapanl & Ashraf, 2011; Rivera-Trigueros et al., 2022).

Update - Web sites offering new topics and information are advantageous over others. Keeping the site updated is about providing the latest information on all the issues discussed. For the site to be interesting for Internet users and for them to visit it more often, the information must be the freshest, most interesting, and most important for monitoring market trends (Davidavičienė & Tolvaišas, 2011).

3. APPLIED METHODOLOGY

Over the years, numerous multi-criteria decision-making methods have been proposed in the literature. Methods differ depending on which research questions are being considered, the type of problem, the theoretical basis, and the type of results obtained. For now, no method can be applied to all kinds of problems, primarily because the methods are created for specific cases, with certain advantages and limitations (Zavadskas et al., 2014). This section below briefly

describes the applied VIKOR (Vlse Kriterijumska Optimizacija Kompromisno Resenje) method (Opricovic & Tzeng, 2004).

3.1. VIKOR method

In this research, the VIKOR (VIšekriterijumska optimizacija i KOmpromisno Rešenje) method was used for selecting national parks website in Serbia based on website quality criteria (Tsai et al., 2010).

VIKOR method is often used for multi-criteria ranking due to being suitable for solving various decision-making problems (Opricovic & Tzeng, 2004). It is especially suitable for situations where they prevail criteria of a quantitative nature (Hezer et al., 2021). This method is based on a compromise solution. It is characteristic of the presence of conflicting criteria and refers to the ranking and selection of alternatives. The ideal is used as a reference point, but there is no alternative that satisfies all the criteria simultaneously, so the solution closest to the ideal solution is sought. That solution is called a compromise solution (Opricovic & Tzeng, 2007; Jati, 2012). Based on the literature review, in many studies, the VIKOR method is used in decision-making analyses such as the energy systems (Zheng & Wang, 2020), the banking sector (Toloie-Eshlaghy & Bayanati, 2012), safety assessment (Hezer et al., 2021), sustainable development (Mateusz et al., 2018), evaluation of countries in various ways (Dang, 2019), tourism sector (Hosseini et al., 2021), construction sector (Gao et al., 2019).

The compromise solution F^c is the result closest to the ideal F*. Compromise means an agreement with mutual concessions by $\Delta f_1 = f_1^* - f_1^c$ and $\Delta f_2 = f_2^* - f_2^c$ as shown in Figure 2.

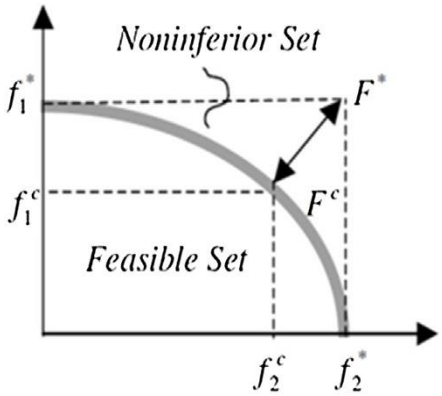


Figure 2. Ideal and compromise solutions (Hezer et al., 2021)

The phases of the VIKOR method for obtaining the compromise ordering are as follows (Opricovic & Tzeng, 2004):

Phase 1. For all criteria functions were defined the best (fi*) and worst (fi^-) values: Where i = 1, 2, . . ., n, and the i-th function represents a benefit. Values of fi* and fi^- are performed by equations (1) and (2), respectively:

$$f_i^* = \max_j f_{ij} \tag{1}$$

$$f_i^- = \min_j f_{ij} \tag{2}$$

Phase 2. Values of Si and Ri are calculated using equations (3) and (4), respectively (j = 1, 2, . . ., n):

$$S_i = \sum_{j=1}^{n} W_j \cdot \frac{f_j^* - f_{ij}}{f_j^* - f_i^-} = \sum_{j=1}^{n} W_j \cdot d_{ij} \qquad i = 1, 2, ..., m \tag{3}$$

$$R_i = \max W_j \cdot \frac{f_j^* - f_{ij}}{f_j^* - f_i^-} = \max W_j \cdot d_{ij} \qquad i = 1, 2, ..., m \tag{4}$$

where W_i is the criterion weight, whose relative significance is defined.

Phase 3. Value of Q_j is calculated using equations (5-7), respectively (j = 1, 2, . . ., n):

$$S^* = \min_j S_j \qquad S^- = \max_j S_j \tag{5}$$

$$R^* = \min_j R_j \qquad R^- = \max_j R_j \tag{6}$$

$$Q_i = v \cdot \frac{S_j - S^*}{S^- - S^*} + (1 - v) \cdot \frac{R_j - R^*}{R^- - R^*} \tag{7}$$

where *x* represents the strategic weight of the majority of criteria (or maximum group utility). In this research v = 0.5. Value of this coefficient can be contained from 0 to 1 (San Cristóbal, 2011). For example, higher values for v (v > 0.5) indicate that the decision maker gives more relative importance to the strategy of satisfying the majority criteria (Fajdek-Bieda, 2021).

Phase 4. By calculating the values of alternatives S^*, R^*, and *Qi* for each alternative in ascending order, three independent rankings can be formed. The value of S^* is a measure of deviation that expresses the demand for maximum group benefit (first ranking list). The value of R^* is a measure of deviation that expresses the requirement for minimization of the maximum distance of some action from the „ideal“ actions (second ranking list). The value of *Qi* represents establishing a compromise ranking that unifies sizes S^* and R^* (third ranking list).

Phase 5. If the two conditions listed below are met, alternative (a´**)**, which ranks according to the best Q (minimum) values is suggested as a compromise solution.

Condition 1. “Acceptable advantage” - *a´´* is the second alternative in the ranking list. Equations (8) and (9) need to be satisfied to fulfil Condition 1, where *m* is the number of alternatives.

$$Q(a'') - Q(a') \geq \mathrm{DQ} \tag{8}$$

$$\mathrm{DQ} = \frac{1}{m-1} \tag{9}$$

Condition 2. “Acceptable stability in decision making” - the best alternative is *a´* and must also be ranked according to the *S* or/and *R* values. During the decision-making process, this compromise solution is stable. If one of these conditions is not satisfied, in that case, it needs to suggest a compromise set of solutions. This set of solutions includes the following: alternative *a´* and a´´ only if *Condition 2* is not met, and alternatives *a´* and a´´, . . ., $a^{(M)}$ if *Condition 1* is not satisfied and $a^{(M)}$ is determined for the maximum *M* with $Q(a^{(M)}) - Q(a') < DQ$ relation (closeness to the positions of these alternatives).

According to *Q* values, the best-ranked alternative is the alternative with a minimum *Q* value. A compromise solution with a compromise ranking list of alternatives and an “advantage ratio” was obtained as the main ranking result.

4. EVALUATION OF THE NATIONAL PARK WEBSITES

4.1. Calculation of the weights of evaluation criteria

Group AHP methodology was used to determine the criteria weights in the defined research model (Coffey & Claudio, 2021). The Analytical Hierarchical Process or AHP method is one of the most famous methods for multi-criteria decision-making. It is used for solving

complex problems, the elements of which are goals, criteria, sub-criteria, and alternatives (Li et al., 2023). The AHP method was developed by Thomas L. Saaty, a professor at the Wharton School of Business (Saaty, 1980). AHP is a multi-criteria technique based on breaking complex problems into a hierarchy. The goal is at the top of the hierarchy, while the criteria, sub-criteria, and alternatives are lower. The AHP method has so far been applied in various areas of strategic management where decisions have far-reaching importance and where decision-makers are happy to choose a quality and reliable advisor in the phase of considering alternatives and determining their effects in relation to the set goals (Saaty, 2004). The AHP has been employed to evaluate websites using subjective approaches based the individual preferences of experts (e.g., Tsai et al., 2010; Akincilar & Dagdeviren, 2014; Kabassi et al., 2019).

In the first proposed model in the research, which was created as a result of the analysis of scientific papers dealing with this topic, experts pointed to more criteria (Section 2), making evaluating a website's quality complex and challenging. Therefore, based on the joint decision of experts, six relevant criteria were identified as key factors for website quality, while the others were excluded from further analysis. Three experts participated in the study and expressed their opinion on calculating a weight for each criterion. The experts answered the questionnaire by comparing the relative importance of various elements on Saaty's one-nine scale through pair-wise comparisons (Saaty, 2004). Their scores were quantified, and the weights of all criteria were defined. The weighting coefficients obtained by the analysis of each of the experts are presented in Table 2. Additionally, the consistency ratio values were smaller than the acceptable threshold value (i.e., CR < 0.1) after computing the results of experts' assessments.

Table 2. Weighting coefficients of each expert

Criteria	**Expert I**	**Expert II**	**Expert III**
C_1	0.15	0.13	0.22
C_2	0.17	0.22	0.18
C_3	0.19	0.13	0.14
C_4	0.07	0.20	0.18
C_5	0.12	0.14	0.12
C_6	0.30	0.19	0.15
Consistency ratio (CR)	**0.077**	**0.085**	**0.076**

All obtained CR values are less than 0.1, which means that the consistency of the estimates obtained from the experts is acceptable, and thus, the complete comparison matrix is considered consistent. Analyzing the individual assessments of each expert can be concluded that their attitudes differed a lot. Namely, expert I evaluated criterion C_6 (0.30) as the most important, expert II assigned the highest relevance for criterion C_2 (0.22), while expert III gave the highest marks to criterion C_1 (0.22). Based on the values obtained in the initial aggregate comparison matrix, the values of weight coefficients for each criterion were obtained, shown in Table 3.

Table 3. Values of weighting coefficients for each criterion

Criteria	**C_1**	**C_2**	**C_3**	**C_4**	**C_5**	**C_6**
Weighting coefficient (AHP)	0.15	0.18	0.19	0.14	0.13	0.20

Based on the subjective assessments of the three experts who participated in the research, it can be concluded that criterion Update of information has the highest weight (0.20), followed by C_3 (Content) with value of the weight (0.19) and C_2 (Navigation), while on the other hand criterion C_5 (personalization) is the lowest rated (0.13).

4.1. Application of the VIKOR method

After calculating the weights for each criterion, the VIKOR method was applied to calculate comprehensive performance variance rates for each alternative. In the defined model, alternatives represent national parks in Serbia: National Park Kopaonik (A_1), National Park Fruska Gora (A_2), National Park Djerdap (A_3), and National Park Tara (A_4). National Park Sara is excluded from the analysis because it has no website. A total of 30 respondents from Serbia, who are also users of national park services, participated in the process of evaluating alternatives. This research aimed not to promote any of the considered presentations or diminish their importance or access to visitors. Bearing in mind that the weights of the criteria were determined in the previous part, this part will present the evaluation of alternatives in relation to the previously defined set of criteria. The decision matrix with initial data is shown in Table 4.

Table 4. Decision matrix

Criteria →	C_1	C_2	C_3	C_4	C_5	C_6
Altenratives ↓	max	max	max	max	max	max
National Park Kopaonik	3.57	4.27	3.60	3.60	3.40	4.53
National Park Fruska Gora	3.60	4.07	3.60	3.87	4.60	3.97
National Park Djerdap	3.50	3.83	3.27	3.30	4.50	4.33
National Park Tara	4.00	4.57	4.47	3.30	3.20	4.63

This research applied VIKOR objective weight (using the AHP method) and VIKOR equal weight (0.17) because this method considers two prioritizations. In this case, for both applications, the values of S*, R*, and Q_i were calculated by selecting $v = 0.5$ and are revealed in Table 5.

Table 5. VIKOR ranking of the websites ($v = 0.5$)

Alternatives	**ID**	**VIKOR**							
		AHP weight				**Equal weight**			
		S*	**R***	**Q_i**	**Rank**	**S***	**R***	**Q_i**	**Rank**
National Park Kopaonik	A1	0.552	0.135	0.284	2	0.579	0.144	0.293	3
National Park Fruska Gora	A2	0.583	0.201	0.316	3	0.534	0.167	0.239	2
National Park Djerdap	A3	0.764	0.187	0.500	4	0.754	0.167	0.500	4
National Park Tara	A4	0.274	0.141	0.000	1	0.333	0.167	0.000	1

Obtained results for AHP weight indicate that the values of R* were A_1(0.135), A_2(0.201), A_3(187), and A_4(0.141), while the results of R* for equal weights were A_1(0.144), A_2(0.167), A_3(0.167), and A_4(0.167). From the Table 5, it can be seen that the views of respondents from Serbia and experts are similar. However, what is much more important is the final rank given to the evaluated websites. According to both prioritizations (objective and equal weights), results show that A_4 had the best overall performance and was the closest to the ideal solution, followed by A_2, A_1, and A_3. It is obvious that the owners, or administrators, of this website A_4 are aware of the importance that websites have in modern business and that they strive to make their websites meet the demands of their visitors. Unfortunately, something similar cannot be claimed for the owners of websites that are labelled as A_2, A_1, and A_3. Their very low ratings indicate the fact that their owners are not sufficiently familiar with all the advantages that the

Internet, that is, the web, provides, or they are not familiar with ways to evaluate the quality of websites.

5. CONCLUSION

The Internet has brought significant opportunities to many different tourist destinations. Tourism development is often mentioned in many protected natural areas as a priority development direction. National parks are repositories of unique natural scenery, cultural assets, and historic resources that are popular and significant as tourism destinations (Tsai et al., 2010).

Serbian national parks provide important recreational and tourism-related resources for domestic and international tourists (Arsić et al., 2017; Arsić et al., 2018). Therefore, based on the existing scientific literature in which the application of multi-criteria decision-making methods was discussed, a set of criteria was formed to evaluate the quality of the websites of National Parks in Serbia. During the formation of the group of criteria, care was taken to select criteria whose meaning would be apparent to the respondents, that is, to the persons surveyed. In addition, care was taken to ensure that the set of criteria contains a small number of criteria to make the survey easier to conduct, even when it comes to respondents unfamiliar with the application of multi-criteria decision-making methods.

The research study involved experts from information and communication technologies. According to experts' opinion, the most important criterion is the Update of information within the first phase of the defined model. Thereafter, based on the implemented VIKOR method, the results showed that one national park stands out and is more aware of the role of the website and is adapted to the needs of visitors. This website belongs to the National Park Tara. Unlike them, the management of the other analyzed national parks should make a significant effort to modernize their websites.

From a theoretical point of view, the paper's contribution is reflected in the definition of a set of criteria for evaluating national parks' websites and a proposed procedure for determining their significance. The paper proposes a multi-criteria model AHP-VIKOR, which enables managers in national parks to analyze the quality of websites and compare them with competitors to improve their overall quality and attract more visitors.

ACKNOWLEDGEMENT

The authors thank Sandra Vasković, the English language teacher, for proofreading the paper.

REFERENCES

Acosta-Vargas, P., Acosta, T., & Lujan-Mora, S. (2018). Challenges to assess accessibility in higher education websites: A comparative study of Latin America universities. IEEE access, 6, 36500-36508.

Agag, G. M., & El-Masry, A. A. (2017). Why do consumers trust online travel websites? Drivers and outcomes of consumer trust toward online travel websites. Journal of Travel Research, 56(3), 347-369.

Agarwal, R., & Venkatesh, V. (2002). Assessing a firm’s web presence: a heuristic evaluation procedure for the measurement of usability. Information Systems Research, 13(2), 168-186.

Akincilar, A., & Dagdeviren, M. (2014). A hybrid multi-criteria decision making model to evaluate hotel websites. International Journal of Hospitality Management, 36, 263-271.

Arsić, S., Nikolić, D., & Živković, Ž. (2017). Hybrid SWOT-ANP-FANP model for prioritization strategies of sustainable development of ecotourism in National Park Djerdap, Serbia. Forest Policy and Economics, 80, 11-26.

Arsić, S., Nikolić, D., Mihajlović, I., Fedajev, A., & Živković, Ž. (2018). A new approach within ANP-SWOT framework for prioritization of ecosystem management and case study of National Park Djerdap, Serbia. Ecological Economics, 146, 85-95.

Bergmann, J. P., Amin, M., Campbell, Y., & Trela, K. (2023). How to find similar companies using websites?. World Patent Information, 73, 102172.

Bronner, F., & de Hoog, R. (2016). Travel websites: Changing visits, evaluations and posts. Annals of tourism research, 57, 94-112.

Coffey, L., & Claudio, D. (2021). In defense of group fuzzy AHP: A comparison of group fuzzy AHP and group AHP with confidence intervals. Expert Systems with Applications, 178, 114970.

Cohen, D., Naim, O., Toch, E., & Ben-Gal, I. (2021). Website categorization via design attribute learning. Computers & Security, 107, 102312.

Cyr, D. (2013). Website design, trust and culture: An eight country investigation. Electronic Commerce Research and Applications, 12(6), 373-385.

Dang, W. V. (2019). Multi-criteria decision-making in the evaluation of environmental quality of OECD countries: the entropy weight and VIKOR methods. International Journal of Ethics and Systems, 36(1), 119-130.

Davidavičienė, V., & Tolvaišas, J. (2011). Measuring quality of e-commerce web sites: Case of Lithuania. Ekonomika ir vadyba, (16), 723-729.

Dianat, I., Adeli, P., Jafarabadi, M. A., & Karimi, M. A. (2019). User-centred web design, usability and user satisfaction: The case of online banking websites in Iran. Applied ergonomics, 81, 102892.

Dreyfus, H. L. (2008). On the internet. Routledge.

Dumitrache, M. (2010). E-Commerce applications ranking, Informatica economica, 14(2), 120-132.

Fajdek-Bieda, A. (2021). Using Entropy-VIKOR method in chemical processes optimization. 25th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems. Procedia Computer Science 192, 4208-4217.

Gao, Z., Liang, R. Y., & Xuan, T. (2019). VIKOR method for ranking concrete bridge repair projects with target-based criteria. Results in Engineering, 3, 100018.

Garett, R., Chiu, J., Zhang, L., & Young, S. D. (2016). A literature review: website design and user engagement. Online journal of communication and media technologies, 6(3), 1.

Garg, R. (2017). Optimal selection of E-learning websites using multiattribute decision-making approaches. Journal of Multi-Criteria Decision Analysis, 24(3-4), 187-196.

Glukhov, V. V., Ilin, I. V., & Levina, A. I. (2015). Project management team structure for internet providing companies. In Internet of Things, Smart Spaces, and Next Generation Networks and Systems: 15th International Conference, NEW2AN 2015, and 8th Conference, ruSMART 2015, Proceedings 15, 543-553. Springer International Publishing.

Gong, J. W., Liu, H. C., You, X. Y., & Yin, L. (2021). An integrated multi-criteria decision making approach with linguistic hesitant fuzzy sets for E-learning website evaluation and selection. Applied Soft Computing, 102, 107118.

Hartono, E., & Holsapple, C. W. (2019). Website visual design qualities: A threefold framework. ACM Transactions on Management Information Systems (TMIS), 10(1), 1-21.

Hassan, S., & Li, F. (2005). Evaluating the usability and content usefulness of web sites: a benchmarking approach. Journal of Electronic Commerce in Organisations, 3(2), 46–67.

Hernández, B., Jiménez, J., & Martín, M. J. (2009). Key website factors in e-business strategy. International Journal of information management, 29(5), 362-371.

Hezer, S., Gelmez, E., & Özceylan, E. (2021). Comparative analysis of TOPSIS, VIKOR and COPRAS methods for the COVID-19 Regional Safety Assessment. Journal of infection and public health, 14(6), 775-786.

Hosseini, S. M., Paydar, M. M., & Hajiaghaei-Keshteli, M. (2021). Recovery solutions for ecotourism centers during the Covid-19 pandemic: Utilizing Fuzzy DEMATEL and Fuzzy VIKOR methods. Expert Systems with Applications, 185, 115594.

Hu, X., Ocloo, C. E., Akaba, S., & Worwui-Brown, D. (2019). Effects of business-to-business e-commerce adoption on competitive advantage of small and medium-sized manufacturing enterprises.

Huang, Z., & Mou, J. (2021). Gender differences in user perception of usability and performance of online travel agency websites. Technology in Society, 66, 101671.

Jati, H. (2012). Comparison of university webometrics ranking using multicriteria decision analysis: Topsis and vikor method. World Academy of Science, Engineering and Technology, 71, 1663-1669.

Kabassi, K., Martinis, A., & Papadatou, A. (2019). Analytic Hierarchy Process in an Inspection Evaluation of National Parks' Websites: The Case Study of Greece. Journal of Environmental Management & Tourism, 10(5 (37), 956-966.

Kim, H. H., & Kim, Y. H. (2008). Usability study of digital institutional repositories. The Electronic Library, 26(6), 863-881.

Lee, Y., & Kozar, K. A. (2006). Investigating the effect of website quality on e-business success: An analytic hierarchy process (AHP) approach. Decision support systems, 42(3), 1383-1401.

Lee-Geiller, S., & Lee, T. D. (2019). Using government websites to enhance democratic E-governance: A conceptual model for evaluation. Government Information Quarterly, 36(2), 208-225.

Li, X., Peng, Y., Guo, Y., Wang, W., & Song, X. (2023). An integrated simulation and AHP-entropy-based NR-TOPSIS method for automated container terminal layout planning, Expert Systems with Applications, 120197.

Mateusz, P., Danuta, M., Małgorzata, Ł., Mariusz, B., & Kesra, N. (2018). TOPSIS and VIKOR methods in study of sustainable development in the EU countries. Procedia Computer Science, 126, 1683-1692.

Merwe, R., & Bekker, J. (2003). A framework and methodology for evaluating e-commerce web sites. Internet Research: Electronic Networking Applications and Policy, 13(5), 330-341.

Nathan, R. J., & Yeow, P. H. (2011). Crucial web usability factors of 36 industries for students: a large-scale empirical study. Electronic Commerce Research, 11, 151-180.

Ng, J. Y., Saini, J. B., & Dzisiak, D. A. (2021). Evaluating the quality of websites providing complementary and alternative medicine patient information for neck pain. Advances in Integrative Medicine, 8(3), 167-186.

Nielsen, J. (1994). Usability engineering. Morgan Kaufmann.

Nielsen, J. (2012). Usability 101: Introduction to usability.

Opricovic, S., & Tzeng, G. H. (2004). Compromise solution by MCDM methods: A comparative analysis of VIKOR and TOPSIS. European journal of operational research, 156(2), 445-455.

Opricovic, S., & Tzeng, G. H. (2007). Extended VIKOR method in comparison with outranking methods. European journal of operational research, 178(2), 514-529.

Palmer, J. W. (2002). Web site usability, design, and performance metrics. Information systems research, 13(2), 151-167.

Pearson, J. M., Pearson, A., & Green, D. (2007). Determining the importance of key criteria in web usability. Management Research News, 30(11), 816-828.

Puron-Cid, G., Luna, D. E., Picazo-Vela, S., Gil-Garcia, J. R., Sandoval-Almazan, R., & Luna-Reyes, L. F. (2022). Improving the assessment of digital services in government websites: Evidence from the Mexican State government portals ranking. Government Information Quarterly, 39(1), 101589.

Rezaeean, A., Bairamzadeh, S., & Bolhari, A. (2012). The importance of Website Innovation on Students' Satisfaction of University Websites. World Applied Sciences Journal, 18(8), 1023-1029.

Rivera-Trigueros, I., Gutiérrez-Artacho, J., & Olvera-Lobo, M. D. (2022). Corporate Websites and their Multilingual Dissemination. An analysis of Southern Spain Tourism Sector. Procedia Computer Science, 204, 419-423.

Saaty, T. L. (1980). The Analytic Hierarchy Process: Planning, Priority Setting. Resource Allocation. New York: McGraw-Hill.

Saaty, T. L. (2004). Decision making - the analytic hierarchy and network processes (AHP/ANP). Journal of systems science and systems engineering, 13(1), 1-35.

San Cristóbal, J. R. (2011). Multi-criteria decision-making in the selection of a renewable energy project in spain: The Vikor method. Renewable energy, 36(2), 498-502.

Shehu, E., Abou Nabout, N., & Clement, M. (2021). The risk of programmatic advertising: Effects of website quality on advertising effectiveness. International Journal of Research in Marketing, 38(3), 663-677.

Simoes, C., Singh, J., & Perin, M. G. (2015). Corporate brand expressions in business-to-business companies' websites: evidence from Brazil and India. Industrial Marketing Management, 51, 59-68.

Tarafdar, M., & Zhang, J. (2005). Analyzing the Influence of web site design parameters on web site usability. Information Resources Management Journal, 18(4), 62-80.

Thongpapanl, N., & Ashraf, A. R. (2011). Enhancing online performance through website content and personalization. Journal of computer information systems, 52(1), 3-13.

Thowfeek, M. H., & Salam, M. N. A. (2014). Students' assessment on the usability of E-leaming websites. Procedia-Social and Behavioral Sciences, 141, 916-922.

Toloie-Eshlaghy, A., & Bayanati, M. (2013). Ranking information system success factors in mobile banking systems with VIKOR. Middle-East Journal of Scientific Research, 13(11), 1515-25.

Tsai, W. H., Chou, W. C., & Lai, C. W. (2010). An effective evaluation model and improvement analysis for national park websites: A case study of Taiwan. Tourism Management, 31(6), 936-952.

Valizadeh-Haghi, S., Moghaddasi, H., Rabiei, R., & Asadi, F. (2017). Health websites visual structure: the necessity of developing a comprehensive design guideline. Archives of Advances in Biosciences, 8(4), 53-59.

Vyas, C. (2019). Evaluating state tourism websites using Search Engine Optimization tools. Tourism Management, 73, 64-70.

Zafiropoulos, C., & Vrana, V. (2006). A framework for the evaluation of hotel websites: The case of Greece. Information Technology & Tourism. 8, 239- 254.

Zavadskas, E. K., Turskis, Z., & Kildienė, S. (2014). State of art surveys of overviews on MCDM/MADM methods. Technological and economic development of economy, 20(1), 165-179.

Zheng, G., & Wang, X. (2020). The comprehensive evaluation of renewable energy system schemes in tourist resorts based on VIKOR method. Energy, 193, 116676.

Volume XIX, Issue (1) (2023) 322-331

International May Conference on Strategic Management

THE MOST COMMON PROJECT MANAGERS AND TEAM MEMBERS' CONFLICT MANAGEMENT STYLES – THE CASE OF SERBIA

Aleksandra Radić*, Nenad Milijić

University of Belgrade, Technical Faculty in Bor, Engineering Management Department, Bor, Serbia

Abstract: An integral component of projects which is necessary for their realization are people. In that case interpersonal conflicts on projects are inevitable. In addition to process and task conflicts, interpersonal conflicts represent one of the important determinants of project success, and therefore it is important to determine which conflict management style is the most dominant. Since previous studies have confirmed the importance of conflict management, this research examined the conflict management style of 29 project managers and 97 project team members. All surveyed project managers and project team members are engaged in projects in Serbia. The results of this empirical research show that the most dominant project managers' styles are Compromising, Integrating and Dominating, while team members' are Compromising, Integrating and Avoiding.

Keywords: Project managers, Team members, Conflict management styles, Projects

1. INTRODUCTION

Conflicts can be observed differently, however what is evident is that conflicts on projects are inevitable (Mantel & Meredith, 2009; Wu et al., 2017; Khorsavi et al., 2020; Mu et al., 2021; Nunkoo & Sungkur, 2021). It is generally known that a project manager must have the skills of leadership, organization, motivation and conflict management in order to lead a project successfully (Mantel & Meredith, 2009; Prieto-Remón et al., 2015), and this confirms that conflicts are part of the project. In support of this, Tariq and Gardezi (2023) state that a project without conflict is an ideal idea unattainable in reality.

However, a successful PM does not avoid conflicts, on the contrary, he or she senses conflicts in the early stages and resolves the conflict before it escalates (Mantel & Meredith, 2009). Conflicts often lead to the need to be resolved through legal means, which incurs high costs. Therefor, Tang et al. (2020) state that one study found that dispute resolution costs in construction projects can reach a 15% of the contract value. However, conflicts do not always have a destructive impact on the projects. Thus, Vaaland (2004) states that conflicts can encourage improvements and creativity on the project as well as lead to new ways of organizing a work in order to achieve the goal of a project-oriented organization.

Recent research (Wu et al., 2017; Mu et al., 2021) found that relationship conflicts, i.e. interpersonal conflicts have a negative impact on project performance, and therefore project

* *Corresponding author: aradic@tfbor.bg.ac.rs*

managers must develop an adequate model of conflict management, both with themselves and with team members (Vaaland & Hakansson, 2003; Mu et al., 2021).

The aim of this paper is to investigate the dominant styles of conflict management on projects in Serbia. The first part of this paper refers to the description of previous research in the field of project conflict management and provides an overview of conflict management styles. The second part of the paper is dedicated to the description of the methodology and the method of data collection, while the third part presents the results obtained based on the methodology used with additional discussion.

2. LITERATURE REVIEW

Figure 1 shows the number of works dealing with the topic of conflict management on projects in the period from 1970 to 2022. It can be seen that researchers are more and more occupied with this issue and that the number of papers is growing over time.

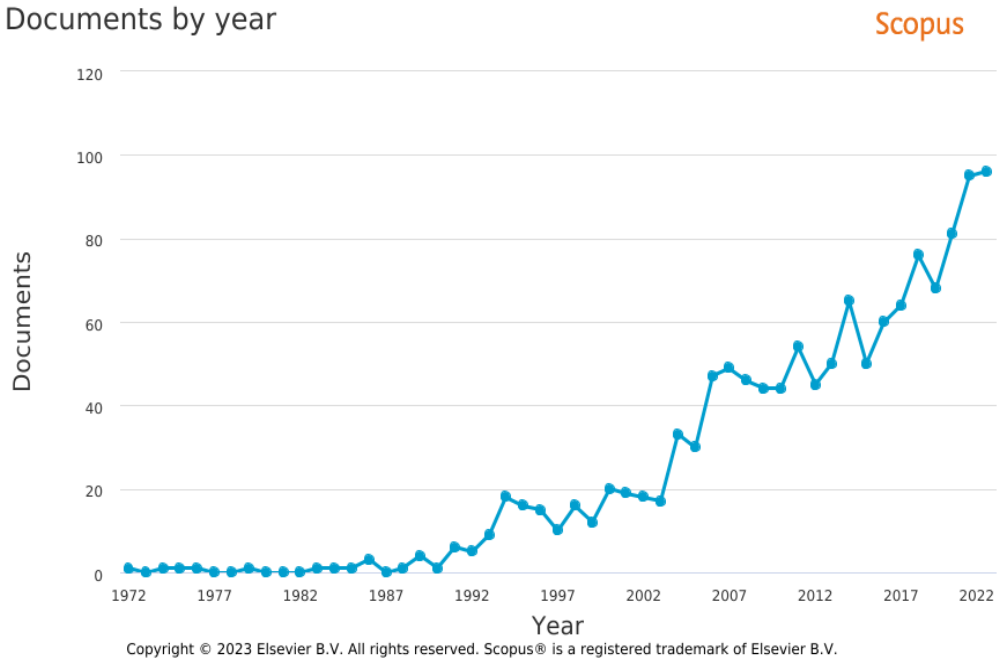


Figure 1. Number of published works on the topic of project conflict management in the period 1970-2022 (Scopus, 2023)

2.1. Conflicts on projects

Conflict is a broad and multidimensional term (Basirati et al., 2020) and in many cases it is used interchangeably with terms such as dispute, disagreement or conflict.

From the perspective of construction projects, conflicts can be defined as mutual interaction between project teams due to different perceptions of project goals (quality, time, money, safety, etc.) as well as poor communication (Wu, 2013). Usually, conflict occurs when there are incompatible goals, thoughts, or emotions among individuals, leading to opposition and disagreement (Prieto-Remón et al., 2015). Analyzing definitions of conflict, Basirati et al. (2020) have concluded that there are three basic elements (two or more elements, connection between elements and differences, i.e. deviation from defined goals) and proposed defining conflict as unwanted variation between two or more related elements.

Contemporary literature and research are directed towards researching the most common causes of conflicts. Thus, Nunkoo & Sungkur (2021) have stated that the most common causes of conflicts are insufficient communication on projects, a source of power that influences subordinates, insufficiently developed organizational culture that does not encourage teamwork, lack of coordination and cohesion in the project team.

Conflicts can have different causes. In the field of construction projects, conflicts most often arise due to insufficiently specified contracts as well as numerous participants in these types of projects (Wu et al., 2017). Conflicts, caused by individuals' attitudes, project communication channels or personal interests, have a significant impact on project performance (Behfar et al., 2008; Khorsavi et al., 2020). Under positive effects, they state stimulated innovation and growth (Crawford et al., 2014), while on the other hand, negative effects are unnecessarily increased costs as well as reduced communication and loss of cohesion (Lee et al., 2020).

Conflicts can arise among the participants in the project, most often among the members of the project team, as well as between the client and the contractor due to the postponement of the project completion date (Tang et al., 2020; Tariq & Gardezi, 2023). Also, project conflicts include conflicts between the project sponsor and the community due to social or environmental issues (Wang et al., 2019; Hernández-Cedeño et al., 2021; Kowszyk et al., 2023). In this work, the emphasis is on interpersonal conflicts and styles of managing this type of conflict.

2.2. Conflict management styles

Conflict management is a tactic used in response to perceived disagreements in social circumstances (Antonini, 1998). Also, these styles can be characterized as established ways of behavior that people use in conflict (Wilmot & Hocker, 2017). This paper uses a classification of five conflict management styles based on the dual concern model (Rahim & Magner, 1995). The Dual Concern Model is based on the earlier work of Blake and Mouton from 1964 and includes two dimensions - concern for self and concern for others. Both dimensions can have the epithets of high and low concern (De Dreu et al., 2001).

The five conflict management styles are described in more detail in Table 1, while the advantages and disadvantages of each style are shown in Table 2.

Table 1. Five conflict management styles according to Rahim and Magner (Tehrani & Yamini, 2020; Kowszyk et al., 2023)

	Avoiding	Compromising	Integrating	Obliging (Accomodation)	Dominating
Concern for self	Low	Meduim	High	Low	High
Concern for other	Low	Medium	High	High	Low
Illustrative behavior	Withdraw, silent, absent, ignoring partner's concern	Each party gives up something	Meets needs of self and possibly other	Reduction of one's need	Selfish, aggressive and argumentative
Outcome	Lose-lose	Neither win/lose	Win-win	Lose-win	Win-lose
Other labels	Withdrawal; most disruptive approach	Smoothing	Most effective; confronting; collaborating; problem solving	subordinating	Forcing; competing; asserting

Table 2. Advantages and disadvantages of conflict management styles (Wilmot & Hocker, 2017)

Conflict management style	Advantages	Disadvantages
Avoiding	Can supply time to think of some other response to the conflict; It is a wise choice when relationship itself is unimportant; Keep one from harm if anything other than avoidance will bring a negative response from the other party.	May signal to others that you do not "care enough to confront"; It gives the impression that you cannot change; It allows conflict to keeps one from working through a conflict and reinforces
Compromising	Sometimes lets conflict parties accomplish important goals with less time expenditure; Requires reinforces a power balance that can be used to achieve temporaryor expedient settlements in time-pressured situations; It has the advantage of external moral force	can become an easy way out—a solution not based on the demands of a particular situation; for some people, compromise always seems to be a form of "loss" rather than "win"; true compromise requires each side giving something in order to get an agreement.
Integrating	Works well to find a collaborative solution that will satisfy all parties; It is a high-energy style that fits people in long-term, committed relationships; Actively affirms the importance of relationship and content goals.	If integrating is the only style used, one can become imprisoned in it people who are more verbally skilled than others can use integrating in manipulative ways
Obliging (Accomodation)	When one finds that is wrong, it can be best to accommodate the other to demonstrate reasonableness; Obliging to a senior or seasoned person can be a way of managing conflict by betting on the most experienced person's judgment.	Can foster an undertone of competitiveness if people develop a pattern of showing each other how nice they can be; People can one-up others by showing how eminently reasonable they are; It may signal to that person that the other is not invested enough in the conflict to struggle through
Dominating	Appropriate for emerging situation; it is useful if the external goal is more important than the relationship with the other person.	Can harm the relationship between the parties because of the focus on external goals; Can be harmful if one party is unable or unwilling to deal with conflict in a head-on manner

3. RESEARCH METHODOLOGY

This research is based on the studies of Rahim and Magner (1995), and the data were collected using a survey methodology. The questionnaire has been taken over and adapted based on the available literature for analyzing conflict management styles (Rahim & Magner; 1995; Wilmot & Hocker, 2017). The questionnaire consists of two parts. The first part is made up of demographic questions (Gender, Age, Project position, Educational level, Years of work experience, Company's existence in years, Company size and Type of project).

The second part of the questionnaire is made up of 25 questions corresponding to the five conflict management styles described in Table 2. For each conflict management style, 5 questions were asked.

As existing studies (Antonioni, 1998; Prieto-Remón et al., 2015; Kowszyk et al., 2023) confirmed the possibility of taking the concept of Rahim and Magner, (1995) from applied psychology into the sphere of project management , the questionnaire was used to reveal the dominant conflict management styles of project managers and project team members in project-oriented organizations in Serbia.

3.1. Data collection and sample

In order to collect data, an anonymous survey of project managers and members of the project team was conducted. Surveys were sent directly to organizations and through the LinkedIn network. The survey was conducted on a group of 150 employees in project-oriented organizations, with 128 filled out questionnaires correctly, which represents 85.33%.

To express agreement with the statements from the questionnaire, a five-point Likert scale was used, where 1 represents the least agreement and 5 represents the greatest agreement.

4. RESULTS AND DISCUSSION

4.1. Demographic characteristics of the sample

Table 3. Demographic characteristics of the sample

Variables	Category	N	Percentage %
Gender	Male	46	36.5
	Female	80	63.5
Age	Less than 25 years	12	9.5
	26 – 35 years	48	38.1
	36 – 45 years	40	31.7
	46 – 55 years	18	14.3
	Above 56 years	8	6.3
Project position	Manager	29	23.0
	Team member	97	77.0
Educational level	Elementary school	8	6.3
	High school	69	54.8
	Higher education	15	11.9
	University	34	27.0
Years of work experience	Less than 5 years	31	24.6
	6 – 10 years	46	36.5
	11 – 20 years	27	21.4
	21 – 30 years	16	12.7
	Above 31 years	6	4.8
Size of company	Less than 10 employees	2	1.6
	11 – 50 employees	16	12.7
	51 – 250 employees	102	81.0
	Above 251 employees	6	4.8
Company's existence (years)	Less than 6 years	43	34.1
	6 – 10 years	2	1.6
	11 – 20 years	3	2.4
	21 – 30 years	68	54.0
	Above 31 years	10	7.9
Type of project	Construction projects	17	13.5
	Industrial projects	94	74.6
	IT projects	10	7.9
	Event organizing projects	5	4.0

More detailed information on the demographic characteristics of the respondents is shown in Table 3. According to the results, women predominate in the examined sample. The largest number of respondents are aged between 26 - 35 years.

The largest number of respondents have high school education and work experience of 6-10 years. When it comes to companies, SMEs predominate and the largest number of companies exist between 21 and 30 years. The respondents come from organizations dealing with Construction, Industrial, Event organizing and IT projects.

4.2. Conflict management styles and type of project

Figures 2-5 show the dominant conflict management styles of managers (a) and project team members (b) for four types of projects. The conflict management styles matrix (Rahim & Magner, 1995) was used to visualize the display, whereby the circles were positioned in the corresponding fields of this matrix. The numbering and size of the circle correspond proportionally to the number of project managers and the number of project team members who have the appropriate conflict management style. In some cases, the respondents had two dominant conflict management styles. Such is the case with the Integrating style and the Compromising style, which indicates that there is an overlap of these two styles in some respondents.

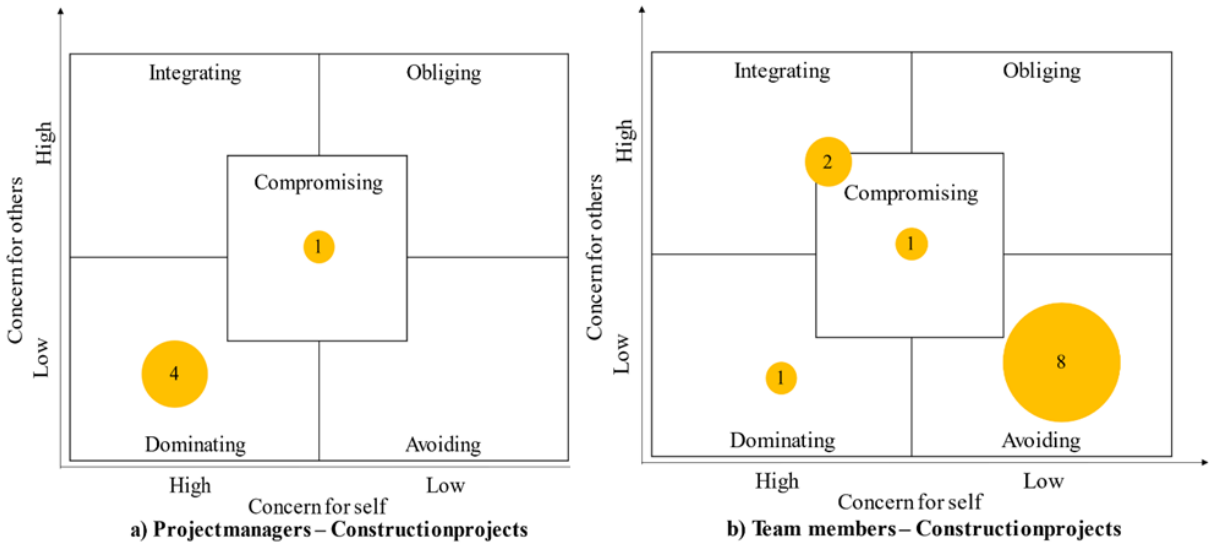


Figure 2. Matrix of dominant styles of project managers (a) and project team members (b) on construction projects

Figure 2 shows a matrix of dominant styles of project managers and project team members on construction projects.

As can be seen from Figure 2, the most prevalent conflict management style among four project managers of construction projects is Dominating, while one project manager has a Compromising style. The dominating style is recognized as the predominant style of conflict management when it is necessary to exercise authority. Given that construction projects are complex projects, Dominating style is desirable in conditions of complex and numerous relationships and lines of communication that exist (Rauzana, 2016). When it comes to project team members on construction projects, eight respondents have an Avoiding style, two respondents have an Integrating style, and one respondent has a Compromising style. Dominating conflict management style.

Figure 3 shows a matrix of dominant styles of project managers and project team members on industrial projects.

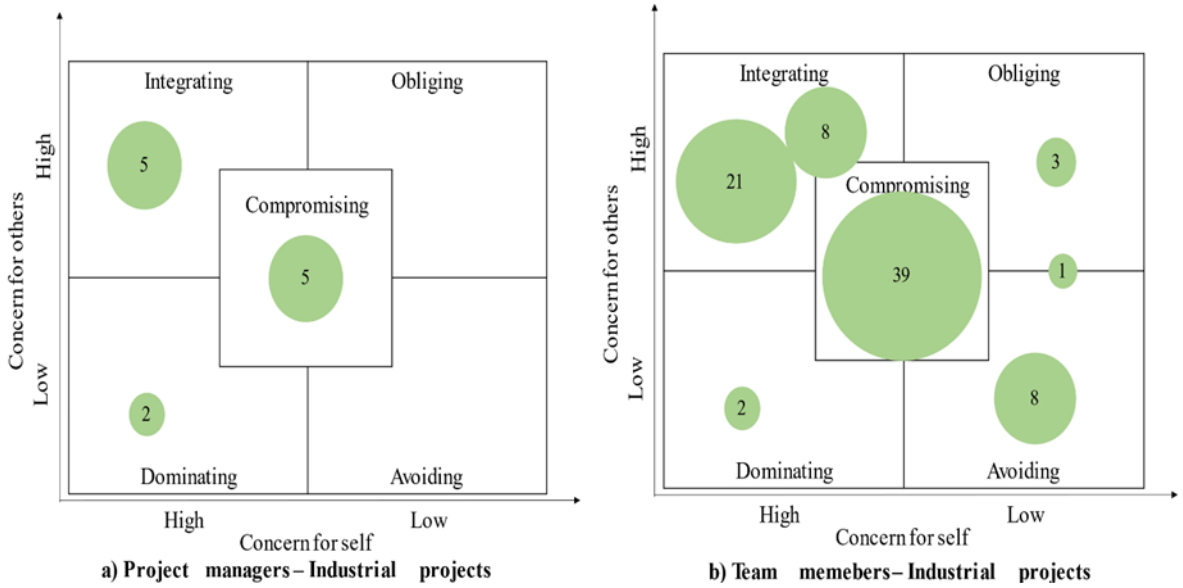


Figure 3. Matrix of dominant styles of project managers (a) and project team members (b) on industrial projects

As can be seen from Figure 3, the most represented conflict management style among five project managers is Compromising and among five project managers it is Integrating, while two project managers have a Dominating style. It can be said that project managers of industrial projects lean more towards a win-win position when it comes to conflicts with the exception of a certain number of project managers who lean more towards a win-lose approach which may be appropriate when quick, decisive action must be taken, such as for example emergencies (Wilmot & Hocker, 2017).

When it comes to project team members on industrial projects, 39 respondents have Compromising, 21 have Integrating, 8 have Avoiding, 3 have Obliging and 2 have Dominating. This indicates that all styles of conflict management are present in industrial projects, which was confirmed by other studies (Kowszyk et al., 2023). Also, with this type of project, in the observed sample, there was an overlap between the Integrating and Compromising style in 8 respondents and Avoiding and Obliging in 1 member of the project team.

Figure 4 shows a matrix of dominant styles of project managers and project team members on event organization projects.

As can be seen from Figure 4, the most prevalent conflict management style among the 2 project managers is Dominating. One project manager has the Avoiding style, while the Integrating style is represented by another project manager. When it comes to members of the project team on Event organizing projects, 1 respondent has the Compomising style.

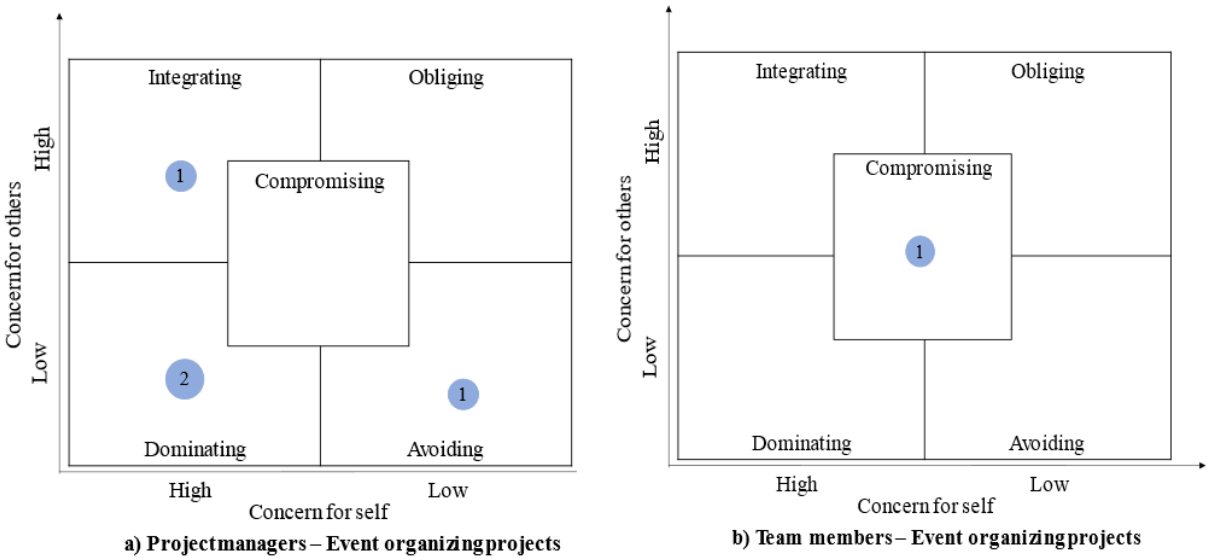


Figure 4. Matrix of dominant styles of project managers (a) and project team members (b) on Event organizing projects

Figure 5 shows a matrix of dominant styles of project managers and project team members on IT.

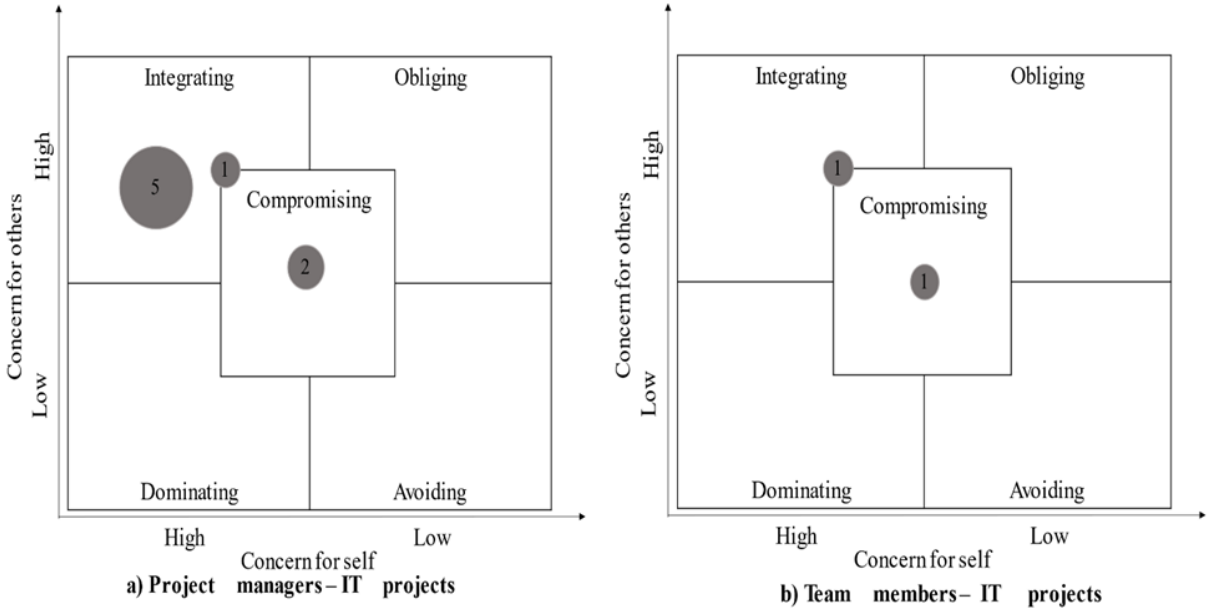


Figure 5. Matrix of dominant styles of project managers (a) and project team members (b) on IT projects

As can be seen from Figure 5, the most prevalent conflict management style among 5 project managers is Integrating, 2 project managers have Compromising, while one project manager has Compromising and Integrating as overlapping styles. When it comes to project team members, one team member has a mixture of Integrating and Compromising styles, while another team member has a Compromising conflict management style. Having on mind that IT projects implement agile concept, adequacy of applied conflict management style depends the most of IT project life cycle stage (Crawford et al., 2014).

5. CONCLUSION

This paper presents the results of empirical research on conflict management styles of project managers and project team members on projects in Serbia. This research generates several conclusions.

Project managers usually have a Compromising, Integrating and Dominating style as the most prevalent conflict management style. Compromising and Integrating styles, which by their nature are win-win conflict management strategies, are desirable and thus contribute to better project performance. Dominating style, although it belongs to win-lose strategies, is a very effective strategy when dealing with complex projects like event organizing projects and construction projects.

Team members have Compromising, Integrating and Avoiding as the most dominant conflict management style. Compromising and Integrating style are favorable and most desirable styles of conflict management and as such have a positive influence on the course of the project, while Avoiding style according to its theoretical concept represents low concern for self and can cause dissatisfaction among project team members. In this regard, the implication that arose from this research is that in construction and industrial projects, more attention should be paid to the development of constructive win-win conflict resolution strategies.

This work also has its own limiting factors such as sample size and disproportionate sampling of project managers and team members for different types of projects. Future research on interpersonal conflicts will be focused on combining Conflict management styles and Big Five Personality types in the field of project management

REFERENCES

Antonioni, D. (1998). Relationship between the big five personality factors and conflict management styles. International journal of conflict management 9 (4), 336-355.

Behfar, K. J., Peterson, R. S., Mannix, E. A., & Trochim, W. M. (2008). The critical role of conflict resolution in teams: A close look at the links between conflict type, conflict management strategies, and team outcomes. Journal of applied psychology, 93 (1), 170-188.

Crawford, B., Soto, R., de la Barra, C. L., Crawford, K., & Olguín, E. (2014). Agile software teams can use conflict to create a better products. In International conference on human-computer interaction (pp. 24-29). Springer, Cham.

Davaei, M., Gunkel, M., Veglio, V., & Taras, V. (2022). The influence of cultural intelligence and emotional intelligence on conflict occurrence and performance in global virtual teams. Journal of International Management, 28(4), 100969.

De Dreu, C. K., Evers, A., Beersma, B., Kluwer, E. S., & Nauta, A. (2001). A theory-based measure of conflict management strategies in the workplace. Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior, 22 (6), 645-668.

Hernández -Cedeño, I., Nelson, P. F., & Anglés-Hernández, M. (2021). Social and environmental conflict analysis on energy projects: Bayesian predictive network approach. Energy Policy, 157, 112515.

Scopus. (2023). Available at: https://www.scopus.com (Accessed in March, 2023)

Kowszyk, Y., Vanclay, F., & Maher, R. (2023). Conflict management in the extractive industries: A comparison of four mining projects in Latin America. The Extractive Industries and Society, 13, 101161.

Mantel, S. J., & Meredith, J. R. (2009). Project management: a managerial approach. John Wíley and Sons, Inc.

Nunkoo, D. K., & Sungkur, R. K. (2021). Team conflict dynamics & conflict management: derivation of a model for software organisations to enhance team performance and software quality. Global Transitions Proceedings, 2(2), 545-552.

Prieto-Remón, T. C., Cobo-Benita, J. R., Ortiz-Marcos, I., & Uruburu, A. (2015). Conflict resolution to project performance. Procedia-Social and Behavioral Sciences, 194, 155-164.

Rahim, M. A., & Magner, N. R. (1995). Confirmatory factor analysis of the styles of handling interpersonal conflict: First-order factor model and its invariance across groups. Journal of Applied Psychology, 80 (1), 122–132.

Rauzana, A. (2016). Causes of conflicts and disputes in construction projects. IOSR Journal of Mechanical and Civil Engineering, 13 (05), 44-48.

Tang, Y., Chen, Y., Hua, Y., & Fu, Y. (2020). Impacts of risk allocation on conflict negotiation costs in construction projects: does managerial control matter? International Journal of Project Management, 38(3), 188-199.

Tariq, J., & Gardezi, S. S. S. (2022). Study the delays and conflicts for construction projects and their mutual relationship: A review. Ain Shams Engineering Journal, 101815.

Tehrani, H. D., & Yamini, S. (2020). Personality traits and conflict resolution styles: A meta-analysis. Personality and Individual Differences, 157, 109794.

Vaaland, T. I., & Hakansson, H. (2003). Exploring interorganizational conflict in complex projects. Industrial marketing management, 32(2), 127-138.

Wang, N., Ma, M., Wu, G., Liu, Y., Gong, Z., & Chen, X. (2019). Conflicts concerning construction projects under the challenge of cleaner production–case study on government funded projects. Journal of Cleaner Production, 225, 664-674.

Wilmot, W., & Hocker, J. L. (2017). Interpersonal conflict, 10th edition. McGraw-Hill Education.

Wu, G., Liu, C., Zhao, X., & Zuo, J. (2017). Investigating the relationship between communication-conflict interaction and project success among construction project teams. International Journal of Project Management, 35 (8), 1466-1482.

Volume XIX, Issue (1) (2023) 332-340

International May Conference on Strategic Management

INVOLVEMENT AND ENGAGEMENT OF VOLUNTEERS IN THE IMPLEMENTATION OF CHARITY PROJECTS

Solveiga Blumberga*, Enija Kristena Abolina

RISEBA University of Applied Sciences, Riga, Latvia

Abstract: In recent years, volunteering has become an exciting and socially important activity involving more and more people around the world. The aim of the current research is to explore the involvement and engagement of volunteers in the implementation of charity projects and to develop proposals for the management of charity projects, how to increase volunteer involvement and engagement in the implementation of charity projects. This study raised the following issues: What factors facilitate involvement of volunteers in the implementation of charity projects? What are the main factors affecting engagement in charity projects? Is there a correlation between the emotional gain of engaging in a charity project and the visibility of the charity project? The study surveyed 300 volunteers participating in charity projects. As a result of the study, it was concluded that volunteer involvement in the implementation of charity projects is facilitated by mutual relations within the project team. The volunteer must see and feel that team members perform their work qualitatively and count on their thoughts, which will contribute to a better common involvement. However, the engagement is facilitated by emotional gain, dedication to work, positive feedback from others about the charity project, personal link with the charity project, as well as support of families and friends for the involvement in the charity project and absorption. By building a stronger personal link with the charity project, the volunteer will also increase emotional gain, which can help to promote involvement and engagement in the implementation of charity projects. The results of the research show the need to further explore volunteer involvement in project implementation and the development of relevant proposals.

Keywords: involvement, engagement, project manager, volunteer, charity project

1. INTRODUCTION

Volunteering is described as an activity of heling outside a single household and its main objective is not to earn money, but to act in the public interest and for a common purpose (Smith et al., 2017). The popularity of volunteering today is also reflected in the United Nations Voluntary National Review for year 2020, which shows a rapid increase in the number of volunteers around the world who are involved in the implementation of projects directly at national level rather than internationally. Volunteering is clearly needed in the implementation of charity projects, as these types of projects usually have limited budgets and insufficient resources to attract fully paid personnel. Volunteers in the organisation operate in total from 168 countries and exceed 9 thousand volunteers (Statistical and financial information, 2020).

* *Corresponding author: solveiga.blumberga@riseba.lv*

However, volunteers are not always active and willing to participate in project implementation, therefore a study was carried out to explore volunteer involvement and engagement in the implementation of charity projects, and to develop proposals for charity project management on how to increase volunteer involvement and engagement in the implementation of charity projects.

2. GENERAL CHARACTERISTICS OF THE INVOLVEMENT

Involvement is defined as the employee's impact on work via communication processes. The extent of involvement may vary significantly depending on the stage, form, level, and range of the topic. It can move from simple exchange of information via consultation to participation in co-decision. Decisions that can involve employees can range from tasks to corporate strategic issues (Lopes et al., 2016). Engagement is a tool to enable employees to identify and solve change-related problems (Harrington & Mignosa, 2017). Manager plays the greatest role in the process of engagement. The manager must adopt a participatory management approach involving open communication, trust, cooperation, listening to, and a willingness to involve employees more in the process of change (Harrington & Mignosa, 2017). There are three main types of employee involvement: participation management, participation of representatives and quality circle (Mambula et al., 2021).

3. EXPLANATION OF ENGAGEMENT

Engagement often means different things, but the general prerequisite is that engagement is somehow beneficial (O'Brien & Cairns, 2016). Due to great dedication and focus on their work activities, engaged employees show better performance and better financial results. Moreover, given the openness to new experiences, the engaged employees have more creative ideas and are likely to innovate and be entrepreneurial (Bakker & Albrecht, 2018). Three types of engagement are distinguished. One of them is behavioral engagement, which means, for example, engaging in discussions, questioning, focus, concentration, and others. Cognitive engagement is described as the next way. It is characterised by the desire to engage and use the efforts needed to understand and master complex tasks. Finally, there is emotional engagement. This type is characterised by how the employee feels connected with the company emotionally, receiving support from management and other aspects (Alrashidi et al., 2016). It is also important for the management of the company to establish positive relationships with employees, career development opportunities of employees (Hewwit, 2015).

4. ROLE OF PROJECT MANAGER IN INVOLVEMENT

The project manager is part of the whole project and project team. He must not only apply the technical skills in managing the project, but must lead the project team members, cooperate effectively, and positively influence other stakeholders (Henkel et al., 2019). Performing their job, the project manager will apply different management styles to achieve the desired goals. Different management styles are described, such as forced management style, where all the rules, events will be centralised towards the manager. Affiliation style, where the manager tries to create a harmonious atmosphere in the team. There is also an authoritative management style when the subordinates are required to reach the company's vision. There is also a demographic management style, pace-leading management style, where the manager demands perfection, moving upwards, and high standards from subordinates, as well as a coaching style where the

manager helps his subordinates evolve (Thoha & Avandana, 2020). The right choice of project manager is a challenge for any project-based organisation and must also look at the competences of the project manager (Meng & Boyd, 2017). Some of the most important competences are the ability of the project manager to listen to and hear their project team members. It is possible to develop this skill with the help of various activities — maintaining eye contact, repeating what is said by asking questions, summarising the information provided and others (Englund & Bucero, 2019). The project manager is also responsible for creating the internal environment. There are elements characterising the internal environment of a successful project, for example, suitable management style and proper management decisions, management maturity, culture acceptance, and others (Joslin & Müller, 2016).

5. CHARACTERISATION OF VOLUNTEERING

In scientific literature, the concept of "voluntary work" is widely explained. Most often, it is described as a voluntary decision to help in the organisation and implementation of tasks. Pupils and students are most often involved in volunteering. Volunteering can range from helping a neighbour or a stranger to providing assistance to a company (Millora, 2016). As a rule, six volunteering motives are distinguished: opportunities for career development, raising self-esteem, protection to reduce negative feelings, the desire to learn the world, and personal values. Value orientations that stimulate volunteering include empathic care, the use of care principles, caring for the next generation, moral responsibilities (Einolf & Yung, 2018). When recruiting a volunteer, it is important to identify the benefits for which the volunteer would like to engage. Offering benefits is a very important step and should be carefully planned, as well as clearly defined in the terms of reference, so that the volunteer wants to get involved (Lehn, 2018). In volunteering, if carried out within an organisation, it is important that the organisation's management involves volunteers. A variety of good governance practices are being implemented. These include general satisfaction with the company, organisational support, and increased social interaction with other volunteers (Einolf & Yung, 2018).

6. GENERAL CHARACTERISATION OF CHARITY PROJECTS

Charity projects in scientific literature are described as a non-traditional type of projects, where the organisation, execution and progress management of the project is carried out with a single purpose and uses public involvement to implement it (Taylor, 2016). A charity project can be regarded as such if one of the objectives is related to poverty reduction, education development, development of religion, or any other objective beneficial to society, which does not fall within any of the above categories. However, a charity project cannot be regarded as an activity that derives personal benefit from the realisation of the project, private favour, preached political objectives or any other activity that is illegal or contrary to public order (Main, 2014). As regards the involvement of project managers in charity projects, the use of professional project management in the charity sector has increased over the last 10 years. Charity professionals often come from local authorities. As charity organisations work with a limited budget, they considered their project experience as an asset (Association for Project Management, 2021). People have different motivations to engage in projects as volunteers. Donation of money to charity projects can be characterised by the principle of exchange. People donate money to gain positive emotions and self-image in return. Donation to people in need, children who cannot afford medical care or others who cannot afford anything, acts as EGO booster, while pointing out that the donor earns more and can afford it (Surana & Lomas, 2014).

7. RESEARCH

Quantitative data are derived from the survey. The survey was created on the Webropol Surveys website. A total of 300 respondents who are volunteers in charity projects responded. Out of 300 respondents, 84 % were women and 16 % men. 48 % of survey respondents were aged 18-25. 22 % of respondents were over 45 years old. Between 26 and 35, there were 13 % of respondents. Respondents aged between 36 and 45 were 11 %, the lowest number of respondents – 6 % - were under the age of 18. The questionnaire was published and disseminated in different groups of peers. Peer groups were selected related to charity projects and likely to have volunteers involved in the implementation of charity projects. The survey offered statements to be assessed by respondents on the Likert scale. The following options were proposed for the assessment of statements: 0 — never, 1 — almost never, 2 — rarely, 3 — sometimes, 4 — often, 5 — always. In total, 50 statements were offered to respondents to be assessed. The first 24 statements have been created by authors based on analysed theoretical literature. They are divided into 6 scales: visibility of the charity project, feedback from others about the charity project, emotional gain, personal link with the charity project, support from family and friends, public benefit. In the first scale, visibility of the charity project included statements related to whether the charity project is recognizable in the society. The second scale, or feedback from others about the charity project, includes claims as to whether the charity project participants or other people are positive about the charity project. The third scale — emotional gain, includes statements that describe what the volunteer gets emotionally engaging in the implementation of the charity project. The fourth scale, which is a personal link to a charity project, provides statements to see if a volunteer feels connection with the charity project in which they are involved. Support from family and friends is the fifth scale in which volunteers should assess statements related to whether family and friends provide support while they were engaged in charity projects. Finally, there is a sixth scale — public benefit, with statements on whether the implementation of a charity project brings some common benefit to the society in general. Statements from 25-41 are from the UWES (Martinez Schaufeli) survey, which measures engagement on three scales: absorption, dedication to work, keenness (Bakker & Leiter, 2010). Statements 41-50 are derived from the GALLUP (George Horace Gallup) survey, according to which the involvement of volunteers can be determined, and statements were adapted to match the implementation of charity projects (Newport, 2016). The GALLUP survey does not include questions related to professional development, as they relate to paid, permanent work, not volunteering. In total, there are three scales: basic needs, teamwork, individual contribution.

8. RESULTS

As a result of the study, it was found that the highest scores in the scales developed by the authors were based on statements that volunteers appreciate the organisation’s charity projects, which were rated 4.5 (max 5). The statement about the volunteer being proud of their contribution to the implementation of charity projects was evaluated 4.5. Respondents assessed with the average rating of 4.5 also the statement about volunteers being open and sharing information with others about their progress in implementing charity projects. This means that the volunteers feel the above statements either very often or always.

In the UWES survey scales, the highest score of 4.5 got the statement that the work on the implementation of the charity project is encouraging, as well as the statement that the

implementation of charity projects is targeted and meaningful. These assessments also show that volunteers feel these statements very often or always.

In the GALLUP survey scales, the highest score of 4.3 received the statement that the volunteer knows what the charity project manager expects from him, as well as the statement that the purpose of the charity project makes it possible to feel that the work is valued – assessed 4.3. The results show that volunteers feel these statements very often.

Responding the research question – what factors contribute to volunteer involvement in the implementation of charity projects, descriptive statistics were carried out for GALLUP survey scales and the results are shown in Table 1.

Table 1. Descriptive statistics for GALLUP survey scales (n=300)

	Provision of basic needs	Individual contribution	Teamwork
Valid	300	300	300
Arithmetic mean	3.22	2.96	3.35
Median	3.00	3.00	3.00
Moda	3.00	3.00	3.00

To assess what factors contribute to volunteer involvement, the focus was on the arithmetic mean. When analysing the data, it can be emphasised that the arithmetic mean is within the same limits, but for teamwork it is slightly higher — 3.35, which means that volunteers have assessed this statement higher. Volunteers assessed the teamwork and the overall atmosphere in the team the highest. A similar result is also for scales on the provision of basic needs — 3.22, which volunteers draw their attention to.

Responding to the research question on whether there are any main factors affecting engagement in charity projects, a linear regression analysis was carried out. The results obtained are shown in Table 2.

Table 2. Results of linear regression analysis (n=300)

Affecting factors	Affected factor	Determination coefficient R^2	Beta (B) coefficient	p value
Visibility of charity projects	Emotional benefits of engaging in charity projects	0.912	-0.02862	0.287
Positive feedback from others about the charity project			0.12514	0.001
Emotional gain from engaging in a charity project			0.63624	0.001
Personal link to the charity project			-0.07345	0.009
Support from family and friends for engaging in a charity project			0.05619	0.155
Dedication to work			0.56190	0.001
Absorption			-0.24559	0.001
Keenness			-1.96e-4	0.997
Basic needs			-0.00154	0.962
Individual contribution			0.04090	0.327
Teamwork			-0.07983	0.063

The results of the analysis show that the determination coefficient or R^2 = 0,912, which means that 91.2 % of the emotional gain when participating in a charity project is determined by such factors as the visibility of the charity project, positive feedback from others about the charity project, personal link with the charity project, support from family and friends for engaging in the charity project, public benefit, dedication to work, absorption, keenness, as well as provision of basic needs, teamwork and individual contribution. The remaining 8.8 % are not included in the study and may be related to other factors. In general, the resulting determination coefficient is high, which means that the factors are selected correctly. Looking at the p value, it can be observed that there is a statistically significant correlation between positive feedback from others about a charity project, a personal link with a charity project, support from family and friends for engaging in a charity project, dedication to work and absorption, as p values are less than 0.05. The beta coefficient is negative in some cases — the visibility of the charity project, the support of families and friends for engaging in a charity project, absorption, keenness, basic needs, and teamwork, which means that these factors do not affect the emotional gain of engaging in charity projects. A strong positive impact is in scales 'personal link with the charity project', where the beta coefficient reaches 0.63624, as well as 'dedication to work', where the coefficient is 0.56190. A relatively high positive impact is also in scale 'positive feedback from others on the charity project' 0.12514.

To answer the next research question - whether there is a correlation between the emotional gain of engaging in a charity project and the visibility of the charity project, an analysis of the correlation test "Pearson" for all three parts of the survey was carried out. The correlation results of the authors' scales are shown in Table 3.

Table 3. Correlation test "Pearson" study results for scales (n=300)

	Emotional gain from engaging in a charity project	Personal link with a charity project
Personal link with a charity project	0.928	
Public benefit from implementation of charity project	0.804	0.815

As can be seen, the strongest correlation (r=0.928, p<0.05) is between the personal link with the charity project and the emotional gain from engaging in the charity project. This means that if there is a more pronounced personal link with the charity project, then the emotional gain will also increase by engaging in a charity project and vice versa. A very strong correlation (r=0,804, p<0.05) is also for the public benefits of engaging in a charity project that correlates with a scale of emotional gain by engaging in a charity project, as well as a high result is a scale by correlating (r=0,815, p<0.05) with a personal link to the charity project. The results of the Pearson correlation test were also determined on the scales of the UWES survey (Table 4).

Table 4. Results of the Pearson correlation test for UWES survey scales (n=300)

	Dedication to work	Absorption
Absorption	0.836	
Keenness	0.872	0.899

As can be seen from the obtained results, there is a very high level of correlation between all scales, which means that there is a statistically significant connection.

The highest correlation (r=0.899, p<0.05) is between scales 'keenness' and 'absorption'. Similarly, high correlation (r=0.872, p<0.05) is between scales 'absorption' and 'dedication to

work', and correlation between scales 'keenness' and 'dedication to work' ($r=0.836$, $p<0.05$) is comparatively smaller. Keenness and absorption also depend on person's dedication to work.

The GALLUP survey scales were also subject to Pearson correlation test, showing strong correlation ($r=0,803$, $p<0.05$) between scales 'teamwork' and 'individual investment', meaning, the better the teamwork and support, the more volunteers will want to invest themselves in the implementation of charity projects.

9. CONCLUSION

According to the study, volunteer involvement in the implementation of charity projects is facilitated by mutual relations within the project team and teamwork. The volunteer must see and feel that team members perform their work qualitatively and count on their thoughts, which will contribute to a better common engagement. **The proposal:** To facilitate the involvement of volunteers, charity project managers should increase their interest in volunteers during the implementation of charity projects. This can be done by organising short individual meetings with each volunteer to find out the feedback and how the volunteer feels engaging in the implementation of the charity project, which would allow the charity project manager to make adjustments to the work if necessary to improve the volunteer's engagement. Charity project managers need to regularly integrate volunteers into the project team throughout the project, creating networking events where both charity project managers and volunteers come together to get acquainted and discuss the implementation of the charity project.

The engagement of volunteers in the implementation of charity projects is facilitated by emotional gain, and how the volunteer is dedicated to this work, whether the work is meaningful, whether the volunteer is enthusiastic and keen in carrying out this work. Positive feedback from others about the charity project, personal link with the charity project, as well as support from family and friends for engaging in the implementation of charity projects and absorption favour engagement. **Proposal:** Since positive feedback about the charity project promotes volunteer engagement, charity project managers should learn the views of the target audience of the project and prepare a press release to be published on social media and on the website, giving an insight into whether the target audience is generally satisfied with the project's outcome.

Answering the question of whether there is correlation between the emotional gain of engaging in a charity project and the visibility of the charity project, it was found that there is no correlation, since the strongest correlation is between the personal link with the charity project and the emotional gain of engaging in the charity project. Which indicates that if, for example, the overall project team treats the volunteer positively, he will make a much greater contribution to the implementation of the projects, or if a more emotionally biding charity project is selected. **The proposal:** Volunteers should engage in charity projects that are of personal importance because, according to the research, personal link and emotional gain contribute to the volunteer's involvement and engagement.

REFERENCES

Alrashidi, O., Phan, H. P. & Ngu, B. H. (2016). Academic Engagement: An Overview of Its Definitions, Dimensions, and Major Conceptualisations. International Education Studies, 9(12), 41-52.

Association for Project Management, (2021). Project management in charity sector – more than just economic value. Retrived from: https://www.apm.org.uk/blog/project-management-in-charity-sector-more-than-just- economic-value/ (Accessed on October 14, 2021).

Bakker, A. B. & Albrecht, S. (2018). Work engagement: current trends", Career Development International, 23(1), 4-11.

Bakker, A. B. & Leiter, M. P. (2010). Work Engagement. A Handbook of Essential Theory and Research. Taylor & Francis. Retrived from: https://www.google.lv/books/edition/Work_Engagement/IZJ5AgAAQBAJ?hl=lv&gbpv=0 (Accessed on October 15, 2021)

Einolf, C. J., & Yung, C. (2018). Super-volunteers: Who are they and how do we get one? Nonprofit and Voluntary Sector Quarterly, 47(4), 789-812.

Englund, R. & Bucero, A. (2019). The Complete Project Manager: Integrating People, Organizational, and Technical Skills. Oakland:B errett-Koehler Publishers.

Harrington, H. J. & Mignosa, C. (2017). Techniques and Sample Outputs that Drive Business Excellence. Boca Raton: CRC Press.

Henkel, T., Marion, J. & Bourdeau, D. (2019). Project manager leadership behavior: task-oriented versus relationship-oriented. Journal of leadership education, 18(2), 1.

Hewwit, A. (2015). 2015 Trends in Global Employee Engagement. AON Empower Results. Retrived from: https://www.aonhumancapital.com.au/getmedia/9228ab41-852b-4c50-abc6-4caa3529c86e/2015-Trends-in-global-employee-engagement.pdf (Accessed on October 15, 2021).

Joslin, R., & Müller, R. (2016). The impact of project methodologies on project success in different project environments. International journal of managing projects in business, 9(2), 364-388.

Lehn, J.M. (2018). Beyond Chemical Synthesis: Self-Organization?! Israel Journal of Chemistry, 58(1-2), 136-141.

Lopes, H., Calapez, T. & Lopes, D. (2016). The determinants of work autonomy and employee involvement: A multilevel analysis. Economic and Industrial Democracy, 1-25.

Main, K. (2014). Partnerships for Community Benefit: A Canadian Handbook on Partnerhsips between Charities and Non-Charities (including Citizenled initiatives). Retrived from: https://communityfoundations.ca/wpcontent/uploads/2019/05/Better_Together_2015.pdf (Accessed on October 15, 2021).

Mambula, C. J., Francis, F. & Oaya, Z. C. T. (2021). Effect of Employee Involvement in Decision Making and Organization Productivity. Archives of Business Research, 9(3), 28-34.

Meng, X. & Boyd, P. (2017). The role of the project manager in relationship management. International Journal of Project Management, 35(5), 717-728.

Millora, C. M. (2018). Book Review: Perspectives on volunteering: Voices from the South by Butcher, J., & Einolf, C. J. (Eds.). Nonprofit and Voluntary Sector Quarterly, 47(6), 1313–1316.

Newport, F. (2016). The Gallup Poll: Public Opinion 2015. Rowman & Littlefield Publishers. Retrived from: https://www.google.lv/books/edition/The_Gallup_Poll/KXuBDQAAQBAJ?hl=lv&gbpv=0 (Accessed on October 19, 2021).

O'Brien, H., & Cairns, P. (2016). Why engagement matters. Cham: Springer International Publishing.

Smith, D. H., Stebbins, R. & Grotz, J. (2017). The Palgrave Handbook of Volunteering, Civic Participation, and Nonprofit Associations. London: Palgrave Macmillan.

Statistical and financial information (2020). UN Volunteer statistics by country, 2020. Retrived from: https://www.unv.org/sites/default/files/annual_reports/annual_reports_2020/UNV_2020_AR_Sec-2_Statistical%20and%20Financial.pdf (Accessed on October 14, 2021).

Surana, P., & Lomas, T. (2014). The power of charity: Does giving away money improve the wellbeing of the donor? Indian Journal of Positive Psychology, 5(3), 223-230.

Taylor, P. (2016). The Social Project Manager: Balancing Collaboration with Centralised Control in a Project Driven World. London: Routledge.

Thoha, N. & Avandana, M. N. W. (2020). Project Managers' Leadership Styles and Their Effects on Project Management Performance. Pertanika Journal of Social Science and Humanities, 28(2), 803-816.

Volume XIX, Issue (1) (2023) 341-347

International May Conference on Strategic Management

FOR A SUSTAINABLE STRATEGIC POSITIONING OF THE COMPANY IN THE MARKET: A CASE STUDY OF THE NUMIDIA CONSTANTINE CREAMERY

Berrachedi Rania*, Chaib Rachid, Kahoul Hafida, Klileba Monira

Laboratory of Transportation Engineering and Environment, University of Mentouri Brothers, Constantine 1, Algeria

Abstract: A company's strategic positioning is of crucial importance for its success and sustainability. As a result, any competitive company must find a place in the national or even international market. SWOT is one of the tools used at the organizational level to measure how skillfully a company is aligned with its growth objectives and key success factors. This allows the objectives to be defined based on internal and external factors to achieve them, which means looking at all aspects of the business: commerce, management, administration, etc. This approach consists of identifying and evaluating the strengths and weaknesses that the company has to develop its business, also grow and achieve these goals. It allows us to make an overview of the company's strategy and its positioning in its activity sector. This vision helps to highlight the various possible business strategies that meet customer expectations based on the available means and the desired aspirations, with the objectives of defining corrective measures and putting in place a plan of priority actions. As a case study, we took the creamery Numidia Constantine.

Keywords: SWOT, company, competition, strategy, customer and development

1. INTRODUCTION

In an increasingly competitive environment, any company must assert its differentiation, prove that its offer provides superior value and justify that it is closest to the needs of its potential customers (O'Cass & Sok, 2015; Worm et al., 2017; Hampden-Turner et al., 2020). As a result, any company must correctly define its strategic positioning in its market to provide its success and sustainability (Richey Jr et al., 2014; Dangelico & Vocalelli, 2017;). Indeed, defining corporate positioning is a fundamental step in any strategy development (Dangelico & Vocalelli, 2017; Adıgüzel, 2020). From now on, the company strategic positioning is to put in place a strategy that seeks to give an offer a credible, attractive, and different position from what already exists in the market. Therefore, the purpose of a positioning is to simplify the choice of the consumer/customer in the grip of a plethoric supply on the market, by ensuring that the offer presented has a definite place in their mind. Now, two aspects are figured out in the positioning of a company, namely:

1. The place of the business in the consumers' minds relative to competitors or we can say how consumers perceive the business in the marketplace.

* *Corresponding author: r_berrachedi@enst.com*

2. The place the company wants to be in the market and how it wants to be perceived by consumers.

Consumers define the first aspect. This is, somehow, the result, the actual situation of the market.

The second is defined by the company. It is the desired positioning of the company. It is the choice she realizes, and sometimes it does not correspond to the actuality of the market.

If these two aspects concur, then the company has managed to communicate and transmit to its customers and prospects its desired positioning, which is accordingly an important strategic choice (Hacklin et al., 2013; Cescon et al., 2019). It will define the direction that each of the company's activities will take. In particular, it will enable a company to be consistent in all its choices, whether in terms of products, prices, distribution channels or communication, the objective of our study. As a case study, we took the Numidia creamery in Constantine.

2. WORK METHODOLOGY

Using the right tools, demonstrating a brand's market position is one of the most complex and essential components of running a business. Strategic positioning focuses on how an organization stands out from the competition and provides an advantage to target customers. Therefore, in order to do so, we choose to use the SWOT method and the questionnaire (Berry, 2018; Phadermrod et al., 2019; Teoli et al., 2019) in this study (Figure 1). This method allows any company to identify the strengths, weaknesses, opportunities and threats surrounding it. It is a strategic tool to select the actions to be taken in order to develop an activity while strengthening competitiveness with the objectives of defining corrective measures and setting up a priority action plan.

Figure 1. Principle of SWOT analysis

It is the ideal tool to make the right decisions and grow any business! Even its sustainability and success. This analysis involves assessing whether the company has the strategic capabilities to respond to changes in its environment and then proposing improvements to its situation (Saker et al., 2021; Saker & Chaib, 2022). For applying this method, two types of factors need to be known: internal and external factors. The first

represented by the strengths and weaknesses of the company, includes all the production tools and means that the company can control (Dyson, 2004). The second represented by opportunities and Threats that are not controlled but can be used to the company advantage or in the worst case avoid their risks. This situation allows us to draw strategic axes that will be confirmed by continuing the analysis with other tools. This maximizes the potential (strengths and opportunities) and reduces the effects of weaknesses and threats. Here, we can identify four strategies related to SWOT:

- Offensive strategy of expansion (strength and opportunities): exploiting strengths to take advantage of opportunities.
- Defensive expansion strategy (weaknesses and opportunities): develop continuous internal improvement to reduce weaknesses in order to take advantage of opportunities.
- Defensive strategy (strengths and threats): exploiting strengths to mitigate threats.
- Diversification or repositioning strategy (weaknesses and threats): reduce weaknesses to be less vulnerable to threats.

3. NUMIDIA DAIRY CASE STUDY

3.1. Presentation of the dairy

The Numidia SPA creamery, earlier known as Onalait, is a state-owned company, created in 1997, which is part of the Giplait group, specialized in the manufacturing of dairy products such as milk, cheese, yogurt, butter, Swiss cheese, fermented milk, fresh cream… etc.

3.2. Data collection

As mentioned above, the SWOT method is based on the company's external and internal factors data. To collect them, we have made an exploration work while using surveys and interviews with the managers of the various departments of the company like: marketing, sales, and production. Moreover, outreach work was done with supported customers or surveys conducted with retailers such as convenience stores and supermarkets at the wilaya level.

3.2.1. Internal diagnosis

- Strengths: They include all existing attributes and means within the company that has a positive impact and benefit that can be controlled and managed.

The internal diagnosis shows that the Numidia dairy has many advantages and strengths such as: The diversity of products of the company, it offers all families of dairy products such as cheese, yogurt, butter, milk, fermented milk, small swiss cheese… etc. The good quality characterizes many products like cheese and butter where they are 100% natural and at a reasonable price. The perfect location of the company in the city center of Constantine, close to several retailers such as supermarkets which facilitate the distribution of the products at a low cost, as well as the large surface area it occupies. The distribution is carried out through 110 refrigerated trucks, of which 15 are owned by the dairy and 5 semi-trailers. The high capacity and competence of the workforce, which is estimated at 200 employees, where 80%

are young aged. The recent renovation of the company's machinery, has helped to significantly reduce breakdowns and defaults.

Finally, the Numidia dairy does not cover only the city of Constantine, but it also feeds several other cities of the region such as Jijel, Mila, Skikda, Khenchela and it owns eighteen (18) sale points of which eight (8) are in Constantine.

- Weaknesses: They are the internal factors and attributes that prevent and negatively affect the company's performance. In our case, the Numidia dairy has some weaknesses that must be resolved for future performance improvement.

The first weakness we found was the lack of availability of some of the company's products in the market, especially fermented milk. A great lack in several supermarkets of the city, which are permanent customers and retailers of the creamery. Thus, the instability of the relationship with retailers where several misunderstandings occurred, such as the non-arrival of the order or the desired quantity. We also noticed that their products are not well known to the consumers due to the poor brand marketing (advertising, discounts, etc.) because of the government's budget limitation. Another drawback is that the quality of some products remains unstable and oftenly changes, which has caused complaints from customers, for example, fermented milk, to which they do not add preservative substances, leads to a change in taste and a fast expiration of the product. Finally, there is a strong use of paper at the company level as a means of communication.

3.2.2. External Diagnostic

- Opportunities: They are external factors of the company and play an important role in its development and sustainability.

Constantine is a large city and has many large supermarkets such as Elef, Carrefour, etc. that helps in marketing its products and even its distribution in the city level. Another opportunity for the creamery is the existence of companies at the national level specializing in vehicle assembly, such as "Hyundai" located in the city of Tiaret, and the Chinese truck "Shacman" located at the city of Sétif. Therefore, it is more profitable for the creamery to purchase its fleet from these companies than to export at a much higher cost.

- Threats: Like opportunities, threats are also external factors of the company, but which negatively influence its sustainability and growth.

At the national and even regional level, several state and private companies operate in the same dairy products, notably Soummam and Hodna. The two large latter companies are considered major competitors. They tie their strengths to the good quality of their products and the strong marketing of their brands, which has made them very popular in society. Thus, Constantine is a city that is known for its high temperature during the summer, which causes a risk to the products of the company because they are perishable products, especially dairy products that are sensitive to high temperatures.

4. RESULTS AND DISCUSSION

After the collection of the factors that influence the performance of the company and the diagnosis of the internal and external factors, we present the summary of the results in the SWOT matrix (Figure 2). The analysis of the latter, allows us to make the following observations. Despite the company's many strengths for improvement, it also has several weakness factors which undoubtedly prevent and largely the development and profitability of the Numidia dairy: A serious study is needed to set up a corrective strategy!

Figure 2. The SWOT matrix of the dairy farm NUMIDIA

After the analysis of the results obtained by the SWOT and following the four strategies that we have previously defined, we recommend an action plan, which serves to take advantage of opportunities to improve weaknesses, protect strengths and avoid risks, in order to achieve the desired objective of the continuous improvement of the company.

- We should take advantage of the existence of several supermarkets at the city level of, in order to market our products and increase their availability.
- Companies specializing in vehicle assembly and a great opportunity for the dairy farm, we must continue to supply more vehicles to increase the company's fleet, which will improve distribution performance and customer relationship.
- The dairy has a valuable advantage that it must preserve, which is the good quality of some products such as cheese and butter, in order to confront the threat of strong competition.
- In order to reposition the dairy and be more competitive, the strong skills of the workforce must be well exploited to improve the quality of products such as fermented milk.
- They should take advantage of technology and reduce the use of papers for corporate-level communication.

- To make the Numidia dairy brand more known and attract customers, it is necessary to invest more in marketing and use techniques such as advertising, discount offers, feedback on customer ambitions, etc.

5. CONCLUSION

This work allows us to have a map of the company's strategy and an overview of its positioning in its activity sector. This has guided us to highlight the various possible commercial strategies meeting the expectations of the customers according to the available means and the desired aspirations having the objectives of the definition of the corrective measures and the implementation of a priority action plan. This work is mainly aimed at this objective and serves to set an effective action plan, taking advantage of opportunities to strengthen weaknesses, protect strengths and avoid risks in order to achieve the objective of continuous improvement of this company. Thus, manage to follow the results and the performance of the collaborators, clarify the problems and set the objectives for the coming year.

REFERENCES

Adıgüzel, S. (2020). Market and brand positioning and sustainability strategies in international marketing. International Journal of Scientific Research and Management, 8(9), 9-24.

Berry, T. (2018). What is a SWOT analysis. B Plans. Accessed October, 10.

Besma, S., Rachid, C., & Abdelaziz, K. (2021). For an Effective Management of the Functional Capacities of Companies: A Study of Pharmaceutical Companies. International Journal of Safety and Security Engineering, 11(5), 557-563.

Cescon, F., Costantini, A., & Grassetti, L. (2019). Strategic choices and strategic management accounting in large manufacturing firms. Journal of Management and Governance, 23(3), 605-636.

Dangelico, R. M., & Vocalelli, D. (2017). "Green Marketing": An analysis of definitions, strategy steps, and tools through a systematic review of the literature. Journal of Cleaner Production, 165, 1263-1279.

Dyson, R. G. (2004). Strategic development and SWOT analysis at the University of Warwick. European Journal of Operational Research, 152(3), 631-640.

Hacklin, F., Battistini, B., & Von Krogh, G. (2013). Strategic choices in converging industries. MIT Sloan Management Review.

Hampden-Turner, C., Trompenaars, F., & Hampden-Turner, C. (2020). Riding the waves of culture: Understanding diversity in global business. Hachette UK.

O'Cass, A., & Sok, P. (2015). An exploratory study into managing value creation in tourism service firms: Understanding value creation phases at the intersection of the tourism service firm and their customers. Tourism Management, 51, 186-200.

Phadermrod, B., Crowder, R. M., & Wills, G. B. (2019). Importance-performance analysis based SWOT analysis. International journal of information management, 44, 194-203.

Richey Jr, R. G., Musgrove, C. F., Gillison, S. T., & Gabler, C. B. (2014). The effects of environmental focus and program timing on green marketing performance and the moderating role of resource commitment. Industrial Marketing Management, 43(7), 1246-1257.

Saker, B., & Chaib, R. (2022). Effective and Sustainable Management of Risk Disrupting the Supply Chain Activities: The Case of the ETRAG Company. International Journal of Performability Engineering, 18(11), 770-780.

Teoli, D., Sanvictores, T., & An, J. (2019). SWOT analysis.

Worm, S., Bharadwaj, S. G., Ulaga, W., & Reinartz, W. J. (2017). When and why do customer solutions pay off in business markets? Journal of the Academy of Marketing Science, 45(4), 490-512.

Volume XIX, Issue (1) (2023) 348-357

International May Conference on Strategic Management

ARTIFICIAL INTELLEGENCE IN CUSTOMER VALUE CREATION

Najaf Babayev*

Vytautas Magnus University, Faculty of Economics and Management,Lithuania

Abstract: This research discusses the impact of digital technologies on customer value creation in e-commerce approach in marketing. The use of artificial intelligence (AI) in e-commerce is highlighted as a powerful tool for increasing sales and optimizing operations. The benefits of AI in creating value for the customers are demonstrated with examples such as personalized email recommendations and efficient product suggestions. For better understanding of how to use AI in e-commerce for achieving better outcomes in e-commerce, AI continuums were analysed in this paper. The AI Continuum is introduced to depict the levels of AI and its applications in various settings such as smart homes, smart cities, and autonomous vehicles. The potential of AI to enhance e-commerce infrastructure and improve customer experiences is emphasized. For better understanding of the usage of AI, previous researches and scientific literatures on this research paper were analysed.

Keywords: Artificial Inntellegence, value, value creation,e-commerce, marketing

1. INTRODUCTION

Digital technologies have had a considerable influence on the marketing, media, finance, and transportation industries, as well as on communications and other industries (Melovi et al., 2020; Soni, 2020; Huang & Rust, 2021a,2021b). As a result, conventional marketing has given way to digital marketing. Nevertheless, a paradigm change is already underway, in which more companies are embracing a relationship-oriented approach to their daily operations. This strategy emphasizes maintaining and growing existing ties between organizations and their clients in order to get a competitive edge (Gronroos, 2007). Businesses can reduce the expenditures involved in obtaining new clients by up to seven times by focusing on maintaining connections with their present clients. A technique that may be employed to keep such consumers as clients are to make sure that considerable Value Creation is offered for them to experience. The Value Creation Sphere concept, which allegedly illustrates how value is produced in a supplier/customer relationship, was first presented by Gronroos and Voima (2012).

Artificial intelligence technology has advanced and grown over the past several years into a powerful tool that can boost operations and enhance sales (Samek et al., 2017; Borges et al., 2021). Even a lot of the smaller online merchants are embracing technology that has some kind of artificial intelligence capability.

The biggest potential economic gain from AI in the next years will probably come from higher efficiency in e-commerce, according to PwC (2021), a global brand of professional services organizations. In order to improve employee abilities and free them up to concentrate

* *Corresponding author: najaf.babayev@vdu.lt*

on more engaging, high-value work, this requires automating mundane tasks. It is noted that artificial intelligence has the ability to improve user experiences and strengthen e-commerce infrastructure. Analyses of prior research and scientific literatures were performed on this study report in order to have a better knowledge of the applications of artificial intelligence (AI).

2. ARTIFICIAL INTELLIGENCE (AI) IN E-COMMERCE

AI software algorithms have achieved incredible advancements in the last five years that took decades to truly achieve (Zhu & Chen, 2015). Human performance was obtained by computer vision in 2015; human performance was attained by computer voice recognition in 2017; and human performance was attained by natural language comprehension in 2021.

The authors cover many forms of value creation in the use of artificial intelligence through a thorough literature review (Figure 1): Improvements to Products and Services (Soni, 2020; Panigrahi & Karuna, 2021; Kumar & Kumar, 2021; Bawack et al., 2022); AI Personalization (Panigrahi & Karuna, 2021; Kumar & Kumar, 2021; Bawack et al., 2022); Intelligent Product Recommendations (Kumar & Trakru, 2020; Pallathadka et al., 2021) Given the immense potential for problem-solving that AI technologies have, there are still practical difficulties and a lack of knowledge about the strategic use of AI in order to generate profit (Nichifor et al., 2021).

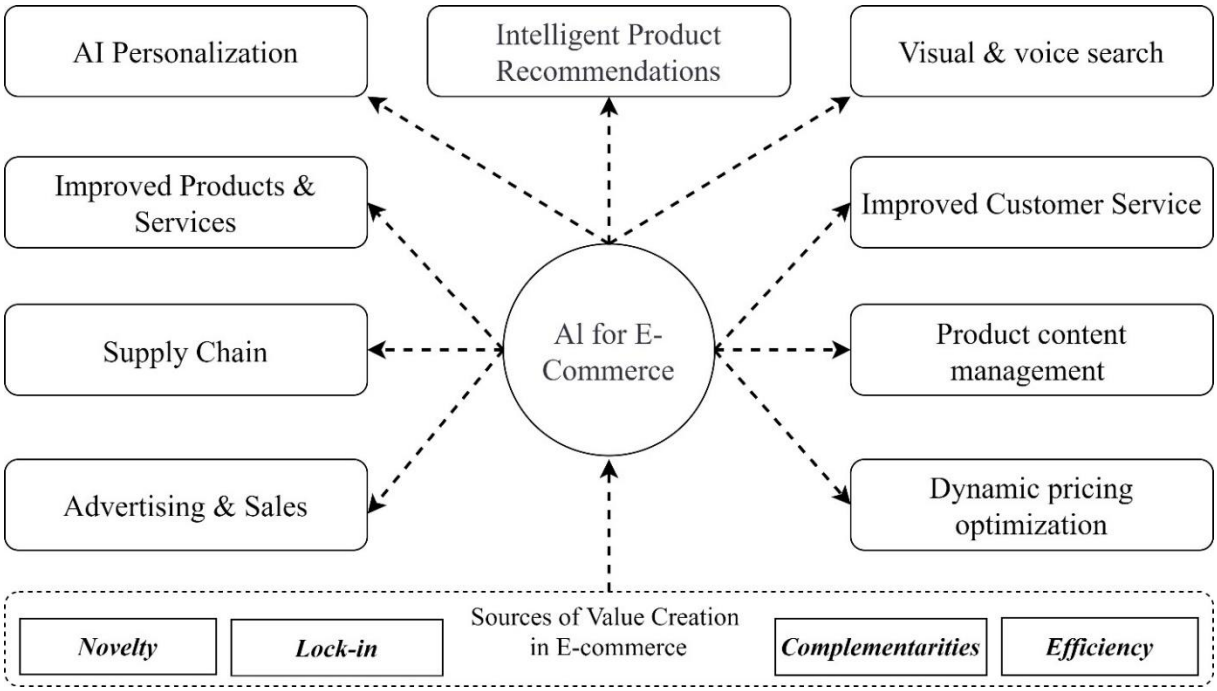


Figure 1. AI application domain as a source of value creation (Developed and created according to Soni, 2020; Pallathadka et al., 2021; Nimbalkar & Berad, 2021; Micu et al., 2021; Panigrahi & Karuna, 2021; Bawack et al., 2022)

By predicting purchasing patterns based on the goods that customers buy and the times that they buy them, artificial intelligence's use in online shopping transforms the E-commerce industry (Samek et al., 2017; Borges et al., 2021; Nichifor et al., 2021). For instance, if online

customers regularly purchase a particular brand of cereal on a weekly basis, the online retailer might make them a customized offer for that product or even use machine learning-enabled recommendations for a complementary item that pairs well with cereal recipes.

E-commerce enterprises may reap the rewards of implementing artificial intelligence by creating a variety of value across the board (Soni, 2020). Amazon has long recognized the potential benefits of technology like artificial intelligence. According to Statista, the use of artificial intelligence in the workplace has the potential to increase productivity by up to 40% (Thormundsson, 2020). In addition, 87 percent of international business organizations believe that artificial intelligence will provide them a competitive edge (Thormundsson, 2020). However, what precisely provides it such a strong impact? the ability to gather and analyze a large amount of data in order to spot patterns and act accordingly in light of such discoveries.

For example, AI may identify a client's purchasing preferences based on the items they've previously bought, and then send that customer a tailored email offering a discount on the product(s) in question (Zimmermann et al., 2022). The following are a few examples of ways to use data gathered by AI to add value to the shopping experience offered by an online retailer. These technologies are also capable of so much more.

Better data for advertising and marketing that is more targeted. Personalization is the top objective, according to the merchants polled, yet just 15% of the stores report having fully implemented it across all channels (Kumar et al., 2019b). By communicating a message that is more tailored and engaging in conversations with specific clients, you may set yourself apart from the competition (Soni, 2020; Panigrahi & Karuna, 2021).

Artificial intelligence and machine learning advancements have made it feasible to personalize content to each unique user, making high personalisation techniques conceivable (Nimbalkar & Berad, 2021; Rafieian & Yoganarasimhan, 2022). By doing big data studies based on consumer purchase histories and other interactions, brands are able to focus in on what it is that their target audience genuinely wants and communicate the content that will resonate with them the most.

What would marketing managers think if AI handled business and automatically changed prices based on the data it had access to? Dynamic pricing is a practice that uses this capability (Shukla, 2019; Yang et al., 2022). By using big data, brand managers may use it to price their products at the best possible level at any given time, taking into account both their own costs and the prices set by their rivals (Yang et al., 2022). These technologies can also predict when it is suitable to raise a product's price and when it is appropriate to start giving discounts, provided they have access to the right information.

For instance, Amazon is one retailer that heavily use a dynamic pricing strategy (Ritala et al., 2014; Carlson, 2021). Every time one of their competitors conducts a discount or campaign, it is customary for them to increase the price of their items by up to 20%.

AI-driven chatbots to enhance customer support. With the help of chatbots powered by AI, businesses may continue to provide customer assistance whenever necessary, including on weekends and during vacations (Soni, 2020; Panigrahi & Karuna, 2021; Nimbalkar & Berad, 2021). AI can answer basic questions and carry out basic tasks, point users in the direction of relevant knowledge base articles, or let users schedule callbacks and leave notes for customer service representatives when they aren't available.

According to Soni (2020), a "chatbot" is "a type of software program that employs use of AI to hold online chat chats via text or speech communication with individuals visiting on the webpage." These chatbots will ultimately direct customers to a real-life human agent who may offer extra support if necessary. The main goal of chatbots when they were originally introduced a few years ago was to give clients pre-programmed responses to often asked inquiries. But as time has gone on and artificial intelligence has advanced, it is now possible for chatbots to help

potential customers with replies and support that are catered to their particular needs and expectations (Nimbalkar & Berad, 2021). Currently, a wide range of e-commerce businesses, including Amazon, Flipkart, Zara, and many more, employ these AI-driven chatbots.

Even while these bots aren't entirely self-sufficient, they can nonetheless respond to about 80% of routine questions (Soni, 2020), freeing up real assistance agents to focus on more challenging issues. Businesses may also utilize chatbots to automatically collect client feedback. For instance, the chatbot may request that clients complete brief questionnaires, after which it would gather the answers independently.

Forecasting of demand and sales. E-commerce businesses frequently utilize forecasting to manage inventory, plan transportation and storage needs, and determine price strategies (Agrawal et al., 2018; Panigrahi & Karuna, 2021). But since historical sales data, especially when combined with seasonal data, are no longer sufficient, it is getting harder to predict demand with accuracy.

To increase the precision and dependability of demand estimates, several businesses have turned to AI for sales forecasting (Sohrabpour et al., 2021). The success of related products, demographics, the weather, online reviews, and social networking sites are all used by AI to anticipate sales and demand rather than merely relying on historical data. As more data becomes available, machine learning will also improve forecasts (Agrawal et al., 2018).

PCM, or product content management. E-commerce companies may now achieve their primary goal, which is to provide each and every one of their clients with the best positive purchasing experience possible, thanks to AI (Soni, 2020; Nimbalkar & Berad, 2021). Cataloging comes first, followed by product design, and ultimately, ensuring that the customer gets the best experience is the final step. Artificial intelligence can help managers in the e-commerce industry create the most efficient and high-quality Product content management (PCM).

It includes the assignment of attributes like categorization, price, and promotional validity, among other things, in addition to the basic product content assets. AI has already been used to develop examples of processing and analyzing material, and it is expected to play a significant role in content creation in the future.

The development of personalized product suggestions for online shoppers, which is leading to higher conversion rates, is one of the most significant uses of artificial intelligence in the realm of ecommerce (Pallathadka et al., 2021). Because AI in e-commerce has access to information about past purchases, internet browsing habits, and searched goods, it is influencing consumer decisions. Big data has been used to get this information. Nimbalkar & Berad (2021) list several advantages for e-commerce companies that offer product suggestions, including the following:

- A rise in the proportion of customers who make additional purchases
- A rise in the quantity of both new and existing consumers
- A more individualized shopping experience for internet shoppers
- Give your business access to a customized email marketing campaign.

Machine learning algorithms are able to analyze historical consumer data that is linked to past preferences and behaviors (Pallathadka et al., 2021). They are able to accurately predict the decisions made by clients and may sell or suggest the products that are most suited for them. It helps companies in the financial industry and e-commerce produce sales and guarantee consumer satisfaction.

In the end, this suggests that AI will help marketing managers improve e-commerce infrastructure so they can more effectively address the needs and preferences of site visitors. Managers can help visitors find new products in a friendly and communicative way, just like

they would if they were speaking with a real person, and they can suggest products and services in an effective way that are actually suitable for customers (Panigrahi & Karuna, 2021).

3. HUMAN AND AI INTERACTION CONTINUUM

According to Figure 2 continuum of human-AI interaction, employing AI in marketing can be extremely important for value generation. Based on marketing studies by Hashim (2018a), Huang and Rust (2021a; 2021b), and Markauskaite et al. (2022a), this figure was created and adjusted. The essential idea of utilizing AI in marketing operations was highlighted by the authors of the publication A strategy framework for artificial intelligence in marketing (Huang & Rust, 2021a) in the modified figure 2. Using AI integration, Huang and Rust (2021a) proposed and created a three-stage framework for strategic marketing planning.

Similar cycles, such as PDCA (plan-do-check-act) or the Deming circle, were first proposed by Deming (1986). Iterative planning and management techniques are used in business to track and improve procedures and goods.

The present planning process, however, is seen to be circular. This cycle doesn't end with marketing campaigns (Huang & Rust, 2021a). When marketing activities are taken, a never-ending cycle of marketing research, strategy, and action is generated, and this feedback—in the form of market data—is then fed back into marketing research.

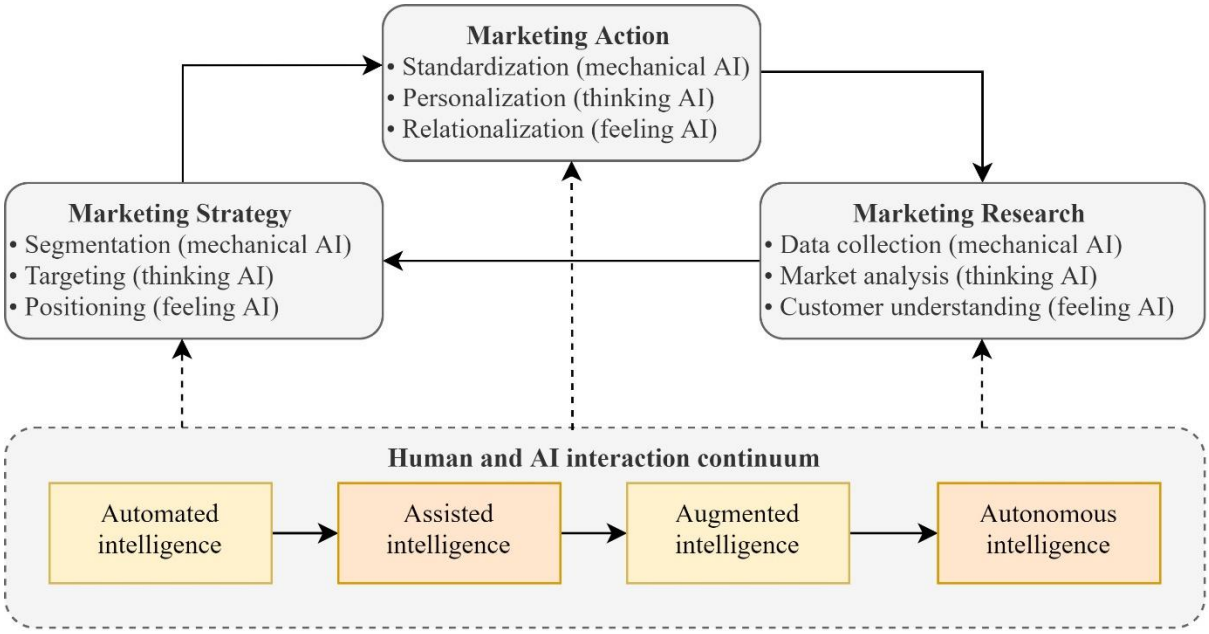


Figure 2. Utilising AI in marketing on the Human and AI interaction continuum (developed and modified according to Hashim 2018; Huang & Rust, 2021a; Huang & Rust, 2021b); Markauskaite et al., 2022b)

According to Figure 2, each of the three phases of strategic marketing may involve key functions for artificial intelligence. This shows how a marketer may employ several types of AI, such as the following:

- Mechanical ai
- Thinking ai
- Feeling ai

The application of computing technology to imitate human skills is known as artificial intelligence (AI). According to the AI intelligence perspective, AI may be developed to have several intelligences for a variety of tasks, much like humans do (Huang & Rust, 2021b).

The goal of mechanical AI is to automate routine and repetitive tasks. Remote sensing, language processing, categorization, clustering, and data preparation are examples of contemporary mechanical AI technology. In general, mechanical AI only slightly adapts and learns new things. According to Agrawal et al. (2018) and Huang and Rust (2021b), it aims to increase efficiency while reducing unpredictability.

Data that is often unstructured is analysed by thinking AI in order to come to new conclusions or judgments (Huang & Rust, 2021a; 2021b). Finding patterns and regularities in datasets is a strength of thinking AI. AI learns from and adapts to data. It could have an instinctual or analytic bent. The goal of analytical AI is to investigate customer variety to identify pertinent patterns (e.g., data mining, text mining). When there is a lot of customer data and the problems are clear, such predicting which new services would appeal to which people, thinking AI is ideal for service personalization (Kumar et al., 2019a).

Learning and adjusting are based on experience for feeling AI (Huang & Rust, 2021a; 2021b). Experience is data particular to a context and an individual. Although it employs them to data based on experience, this level of artificial intelligence contains all the talents of mechanical and thinking AI. AI is thought to be appropriate for service rationalization, which is characterized by a personalized interaction, as well as for customer engagement and satisfaction.

Maintaining customer connections is crucial in e-commerce, including engagement, communication, knowledge, and experience (Nichifor et al., 2021). Since all connections by definition involve personal information, it is logical to believe that AI can handle it in this context. AI must be able to identify human emotions and react to them in the same manner as a human conversation partner. Since feeling AI is still in its early stages of development, much current research on it is exploratory in nature.

During the market research phase, artificial intelligence (AI) is used to gather market information. This includes using mechanical AI to collect data, thinking AI to analyze marketing data, and feeling AI to understand consumers (Huang & Rust, 2021a; 2021b). During the marketing strategy phase, artificial intelligence (AI) is used to make strategic decisions about segmentation, targeting, and positioning. AI is able to engage with customers about a product, identify new customer preference trends in unstructured datasets, and recommend which segments to target. At the marketing action stage, AI is employed individually or collectively for the benefits of standardization, personalization, and rationalization. With the use of AI technology, for instance, payment and delivery processes may be standardized, such as automated payment and delivery real-time monitoring in e-commerce (Panigrahi & Karuna, 2021; Kalia, 2021).

The AI Continuum illustrates the level of human involvement in decision-making or the autonomy of Bots or AI-enabled computer networks with the advancement of AI technological solutions. The continuum of AI distinguishes the many degrees, from Automated intelligence to Assisted intelligence to Augmented intelligence to Autonomous intelligence, as seen in Figure 2.

Automated intelligence: The automation of mental and mechanical processes, both routine and non-routine. This automates current processes rather than creating new ones (Huang & Rust, 2021a; Markauskaite et al., 2022b; Dhiman et al., 2022). The use of mobile robots and self-driving cars by businesses to increase industrial efficiency has several advantages. Automation based on artificial intelligence may be applied in a number of ways that are advantageous to different industries and job sectors. For instance, fraud prevention in e-

commerce ensures that theft or other wrongdoing may be directly linked to the offender (Yarlagadda, 2017; Zaveri & Amin, 2019). AI automation is also essential for helping firms and marketers manage their brands. Because of automation, marketers may quickly gather important data about their company and understand consumer perspectives.

Assisted Intelligence. In order to understand one another and coordinate job execution, humans and AI systems work together (Hashim, 2018b; Huang & Rust, 2021a). AI systems support human decision-making, action, or just help people do tasks more quickly and effectively. The majority of decisions are often made by humans, with bots typically duplicating user actions at different phases of a process based on pre-defined protocols (Pavlou, 2018; Dhiman et al., 2022).

The majority of recent work emphasizes how using AI may improve digital marketing strategies in both developed and developing countries (Basri, 2020). The scenario of AI-assisted content development is one sector that has profited from artificial intelligence-assisted social media marketing (AISMM). It does become particularly crucial for SMBs and startups. Ai technologies give pioneers in this field crucial information about the sorts, styles, or formats of content that certain businesses publish and how their target consumers interact with or engage with the content that is offered on particular social media platforms.

Augmented Intelligence. systems of intelligence that assist humans in making decisions and constantly learn from their interactions with other people and their surroundings (Pavlou, 2018; Hashim, 2018b; Davenport, 2020; Panigrahi & Karuna, 2021). Artificial intelligence (AI) and augmented intelligence are distinguished by using distinct terms; AI often refers to computers wholly replacing people, whereas augmented intelligence is defined as computers enhancing human intellect (Yarlagadda, 2017; Pavlou, 2018).

AI systems that are contextually adopted learn from people and data. AI uses machine learning (ML) on information to improve and optimize future results while acting on behalf of people. For instance, using advanced audio analytics, an intelligent agent may be able to infer from a customer's tone that an unaddressed problem poses a worry and provide real-time feedback to guide the (human) salesperson's next course of action (Davenport, 2020). In this area, AI could improve salespeople's talents, but it might also have unanticipated negative effects, especially if users are worried about AI listening in on conversations.

According to Zaveri and Amin (2019), all of the top innovators in technology are developing apps that enable augmented intelligence. Commercial Internet breakthroughs like Amazon AWS, IBM Watson, and Microsoft Azure are fast developing, and many of these solutions resemble augmented intelligence approaches rather than pure AI (Pavlou, 2018). Additionally, Google's strategy for search engine technology resembles that of augmented intelligence. These platforms are constantly adopting new technology and services to increase their reach and influence.

Autonomous Intelligence. People eventually start to trust artificial intelligence systems and hand over the majority of the responsibility for making decisions to AI algorithms as a result of their capacity to effectively complete real-world and simulation tasks under a variety of conditions over time (Hashim, 2018). AI systems that can operate alone and adapt to different situations without human involvement. "Decision making," which includes complicated problem solving, is the main phrase for automating decision-making processes without human intervention.

4. CONCLUSION

As an illustration, demand forecasting in e-commerce has the potential to accurately anticipate the future for the entire organization using real-time data. AI is being used in e-

commerce to create personalized product suggestions and predict consumer decisions. It can also help marketing managers improve e-commerce infrastructure to address the needs and preferences of site visitors. AI is used in marketing to automate routine and repetitive tasks, analyse data, and personalize services.

Mechanical AI automates repetitive tasks, thinking AI analyzes unstructured data, and feeling AI learns and adjusts based on experience. AI is essential for maintaining customer connections in e-commerce, and can be used to gather market information, make strategic decisions, and standardize processes.

AI automation can be applied in a variety of ways, such as fraud prevention, assisted intelligence, and social media marketing. AI systems can also help humans make decisions and learn from their interactions. AI systems can operate alone and adapt to different situations without human involvement. There has been a growing generation of autonomous and adaptable systems outside of traditional automation, robotics, and computers in industries, such as smart homes, smart cities, smart energy infrastructures, and autonomous linked cars.

REFERENCES

Agrawal, A., Gans, J., & Goldfarb, A. (2018). Prediction machines: The simple economics of artificial intelligence. Harvard Business Press.

Basri, M. (2020). Artificial Intelligence and Digital Marketing: Transforming Marketing Landscape. Journal of Digital Marketing, 2(1), 20-28.

Bawack, R. E., Tchouto, J. J. S., Tchouakeu, L. R. D., & Tambo, T. (2022). Artificial intelligence and value co-creation: A bibliometric analysis of scientific publications. Journal of Business Research, 141, 92-105.

Borges, R., Boccato, L., Moschetti, F., Cavalcante, R., Fernandes, C., & Valle, E. (2021). An Approach to Develop an E-commerce Website. In Advances in Intelligent Systems and Computing (Vol. 1346, pp. 542-548). Springer.

Davenport, T. H. (2020). Artificial Intelligence for the Real World. Harvard Business Review, 98(1), 54-62.

Deming, W. E. (1986). Out of the crisis: Quality. Productivity and Competitive Position, USA: Cambridge University Press.

Dhiman, M., Kumar, P., & Kumar, D. (2022). Intelligent Healthcare Monitoring and Management: A Review on AI-based Systems. Journal of Medical Systems, 46(3), 1-23.

Gronroos, C. (2007). Service management and marketing: Customer management in service competition. Chichester, UK: John Wiley & Sons.

Hashim, M. J. (2018a). The role of artificial intelligence in the future of work. Journal of Business Research, 92, 385-398.

Hashim, N. (2018b). Artificial intelligence in marketing: A review of possible applications. International Journal of Business and Society, 19(S4), 732-741.

Hashim, S. Z. M. (2018c). Human-Artificial Intelligence Cooperation in a Service Industry: A Conceptual Framework. International Journal of Industrial Ergonomics, 68, 48-59.

Huang, M. H., & Rust, R. T. (2021a). Artificial Intelligence in Marketing: Definition, Benefits, and Challenges. Journal of Marketing, 85(4), 1-22.

Huang, M. H., & Rust, R. T. (2021b). Artificial intelligence and service innovation. Journal of Service Management, 32(2), 237-243.

Kalia, N. (2021). Role of artificial intelligence in e-commerce: An overview. International Journal of Research and Analytical Reviews, 8(3), 1372-1378.

Kumar, A., & Kumar, V. (2021). The role of artificial intelligence in value co-creation: An exploratory study. Journal of Business Research, 131, 498-511.

Kumar, A., & Trakru, P. (2020). Artificial intelligence in online retailing: A review and future directions. Journal of Retailing and Consumer Services, 52, 101926.

Kumar, A., Bezawada, R., Rishika, R., Janakiraman, R., & Kannan, P. K. (2019a). From Social to Sale: The Effects of Firm-generated Content in Social Media on Customer Behavior. Journal of Marketing, 83(1), 121-141.

Kumar, V., Rajan, B., Venkatesan, R., & Yao, Y. (2019b). Artificial intelligence (AI) for marketing: Opportunities and research priorities. Journal of Marketing, 83(4), 1-20.

Markauskaite, L., Goel, A., & Teixeira, T. (2022a). Automating Creativity? An Examination of AI-Generated Visuals in Advertising. Journal of Advertising, 51(1), 30-46.

Markauskaite, L., Zavadskas, E. K., Kaklauskas, A., Ubartė, I., & Morkūnaitė, S. (2022b). The potential of artificial intelligence applications for marketing: A systematic literature review. Engineering Applications of Artificial Intelligence, 105, 104604.

Melovi, I., Soni, R., Huang, M. H., Rust, R. T., Gronroos, C., Voima, P., Samek, W., Wiegand, T., Müller, K. R., Borges, M. R. S., Panigrahi, R., Karuna, S., Kumar, A., Bawack, R., Kumar, S., Kumar, V., Trakru, P., & Pallathadka, P. (2020-2022). Digital technologies, artificial intelligence, and value creation: A literature review. Journal of Business Research, 135, 736-746.

Nichifor, A., Trifan, E., & Nechifor, M. (2021). Strategic implications of artificial intelligence adoption in service management. Journal of Service Management, 32(2), 244-254.

Pallathadka, P., & Kumar, S. (2021). AI in the hospitality industry: A systematic review and bibliometric analysis. Journal of Hospitality and Tourism Technology, 12(3), 662-679.

Panigrahi, R., & Karuna, R. (2021). AI-powered personalized e-commerce: A review of literature and future research agenda. Journal of Retailing and Consumer Services, 59, 102406. https://doi.org/10.1016/j.jretconser.2020.102406

Pavlou, P. A. (2018). Artificial intelligence and augmented intelligence in the digital economy. Marketing Science, 37(4), 1-16.

PwC (2021). PwC's Global Artificial Intelligence Study: Sizing the prize. Retrieved from: https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html (Accessed on March 23, 2023).

Rafieian, M., & Yoganarasimhan, H. (2022). Machine Learning Algorithms for Personalized E-commerce. In Advances in Intelligent Systems and Computing (Vol. 1373, pp. 337-349). Springer.

Ritala, P., Golnam, A., & Wegmann, A. (2014). Coopetition-based business models: The case of Amazon.com. Industrial Marketing Management, 43(2), 236-249.

Samek, W., Wiegand, T., & Müller, K. R. (2017). Explainable artificial intelligence: Understanding, visualizing and interpreting deep learning models. arXiv preprint arXiv:1708.08296.

Shukla, A. (2019). Application of AI in E-Commerce for Dynamic Pricing. International Journal of Applied Engineering Research, 14(11), 2619-2624.

Soni, R. (2020). A Comprehensive Review on the Role of Artificial Intelligence in E-Commerce. International Journal of Advanced Research in Computer Science, 11(2), 49-54.

Thormundsson, B. (2020). Reasons for adopting AI in organizations worldwide 2017–2020. Statista. Retrieved from: https://www.statista.com/statistics/747775/worldwide-reasons-for-adopting-ai/(Accessed on March 23, 2023).

Yang, Y., Feng, T., & Whinston, A. B. (2022). Optimal Dynamic Pricing with Competition: A Reinforcement Learning Approach. Decision Support Systems, 146, 113632.

Yarlagadda, P. K. D. V. (2017). Emerging technologies for Industry 4.0. In Industry 4.0: The Fourth Industrial Revolution (pp. 69-100). Springer.

Zaveri, M. A., & Amin, M. B. (2019). Augmented intelligence: The next frontier in digital transformation. Journal of Digital Transformation, 1(1), 26-33.

Zimmermann, D., Hinz, O., Schumann, J., & Söllner, M. (2022). Customized E-mail Marketing with AI: An Empirical Investigation of Success Factors. Journal of Business Research, 136, 23-33.

Zhu, J., & Chen, Z. (2015). Real time face detection system using adaboost and haar-like features. In 2015 2nd International Conference on Information Science and Control Engineering (pp. 404-407). IEEE.

Volume XIX, Issue (1) (2023) 358-368

International May Conference on Strategic Management

STOCK PRICE PREDICTION BASED ON THE MONTE CARLO METHOD

Adrijana Jevtić[1*], Dejan Riznić[1], Miša Tomić[2], Nevena Tomić[3]

[1]University of Belgrade, Technical faculty in Bor, Republic of Serbia; [2]University of Niš, Faculty of Mechanical Engineering, Republic of Serbia; [3]University of Niš, Faculty of Technology, Republic of Serbia

Abstract: The automotive industry market has always been very specific. Today, this market is even more demanding, because the principle of the products offered there is changing fundamentally. The electric cars that are on the market today are still in the early stages, but they have great potential. In this paper, a prediction was made on the stock prices of Tesla, Inc., one of the pioneers in the industry of electric cars. The forecast of stock prices of this company was made for one year, i.e. for 252 trading days settled on the Monte Carlo method. MATLAB software was used for the forecast based on three years of historical data on stock prices. The results of the simulation performed show that the longer the forecast period, the greater the deviations from the historical data. From the predicted values, it can be concluded that the stock price volatility varies greatly in the case of 10,000 possible outcomes and for different prediction periods. In addition to the extreme values of the predicted stock price for the observed period, the most frequently predicted stock price value is close to the average historical price.

Keywords: Automotive industry, Stock price movement, Monte Carlo method, Price prediction, MATLAB, Tesla Inc.

1. INTRODUCTION

The high pollution and climate change affecting nature have indicated the need for a sustainable lifestyle. Since cars became one of the basic products people have used to satisfy their needs, and since they are called big polluters, they have become a threat to the world. This situation created a new market for so-called green or ecological products and the opportunity for new companies to compete. One of these is Tesla, Inc.

Tesla, Inc. was established in 2003 in California (United States). Since 2008, when the biggest shareholder, Elon Musk, became the company's CEO, Tesla started to grow rapidly and became the world's most recognizable electric vehicle producer. Today, it is an American multinational automotive and clean energy company headquartered in Austin, Texas, the most recognizable products are electric vehicles, batteries, and solar systems (Tesla, nd).

In 2021, the global fleet of Tesla vehicles, energy storage, and solar panels enabled its customers to avoid emitting 8.4 million metric tons of CO2e (Tesla, 2021, p.3). The same year, Tesla, Inc. produced 25.39 TWh on its solar systems. The production output for 2022 was

* *Corresponding author: ajevtic@tfbor.bg.ac.rs*

1,369,611 electric vehicles. Some business results of this company for 2022 are presented in Table 1.

Table 1. Tesla, Inc. business results for 2022 (Yahoo Finance, 2023)

Business Results	Revenues	Operating Income	Net Income	Total Assets	Total Stakeholders' Equity
Value (USD thousands)	81,462,000	13,832,000	12,583,000	82,338,000	44,704,000

Tesla, Inc. shares are listed on the stock exchange and traded daily on the stock exchange Nasdaq. The average trading volume is estimated at 166,487,579 shares. According to Yahoo Finance (2023) the major holders (51% of equity) are floats held by institutions, while 44.86% are shares held by institutions.

Based on the trading data that Yahoo Finance provides, potential investors can get some additional information about the target company. The recommendation trend is one of these data. This indicator is based on shareholders' attitudes and experience related to investment in this company. According to this indicator, Tesla's shares are evaluated at a value of 2.4 (Figure 1) which is described as the owner's attitude that rather buy additional shares of this company than keep the same quantity or even sell them.

Figure 1. Recommendation rating for Tesla, Inc. stock possession (Yahoo Finance, 2023)

The shares of this company have been traded on the stock exchange for years, and they are still tradable. According to historical data, the demand for Tesla shares has increased and so has the price. The quantity (volume) of trading is presented in Figure 2 for the period of three years (22 April 2020 – 22 April 2023, total 756 trading days at Nasdaq) that are analyzed in this paper.

Considering the great potential of this company's products, it should not be ignored that Tesla will have more and more competitors over time, especially since today almost all car manufacturers are developing their product lines for electric vehicles. Shares are important channels for raising funds for enterprises, and forecasting share prices is of great importance for equity financing, risk identification, and corporate policy formulation (Wang et al., 2022).

In this paper, a Monte Carlo simulation is used to predict the price of Tesla, Inc. shares for the future period trading year (252 working days). As it is known that when the demand for certain products (in this case shares) increases, their price also increases, the purpose of this paper is to predict the future position of this company in the market as its share price changes. The demand for shares of this company is presumed to be reflected in its share price on the stock market. That information is useful for potential investors, as well as for the company's management.

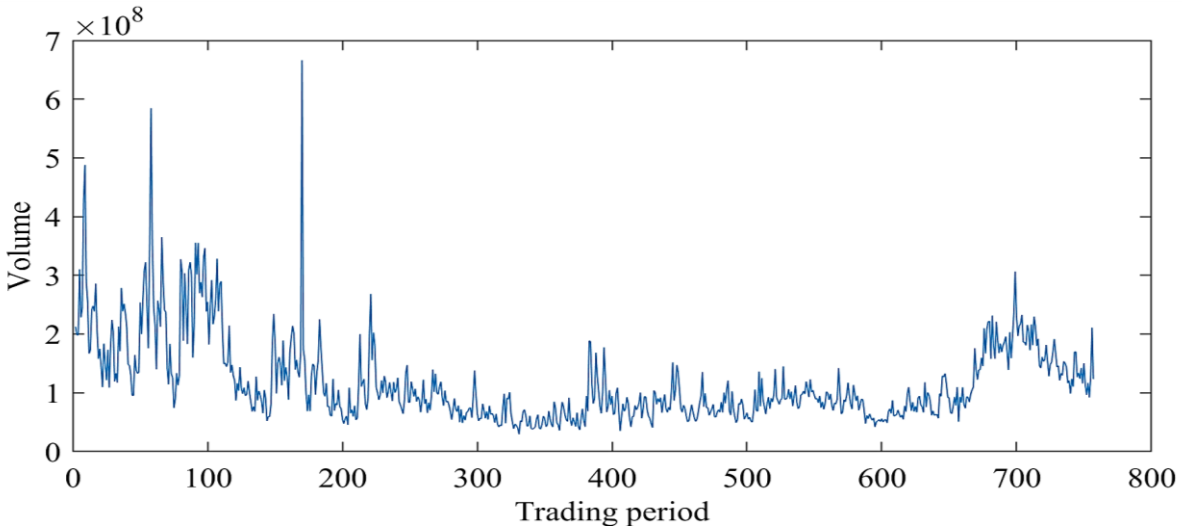


Figure 2. Tesla, Inc. trading volume at Nasdaq for period 22 April 2020 – 22 April 2023 (Adjusted to Yahoo Finance data)

Therefore, the structure of this paper is as follows. After the brief introduction and review of the literature based on the automotive industry and the use of Monte Carlo simulation for price prediction, the results of the simulation will be discussed.

2. LITERATURE REVIEW

Vehicles (cars) are regarded as the most common mode of transportation nowadays. This means that millions of people use it every day. Due to the specificities of the products themselves, the automotive industry is one of the fields most analyzed from a theoretical and practical perspective. Electric vehicles are the most attractive of them. Numerous world experts analyse these products or its producers from various points of view. Here, the focus will be only on those authors that analyse the economic and financial aspects of automotive companies that produce electric vehicles. Special attention is paid to research in the field of price movements of shares of companies on the market.

One of the most popular topics in the automotive industry is the relationship between environmental and economic issues. Many authors concentrate their research on identifying the relationship between these two mutually exclusive categories (Liu et al., 2018; Rovinaru et al., 2019; García-Machado & Martínez-Ávila, 2019; Meckling & Nahm, 2019; Gohoungodji et al., 2020; Haas, 2021; Hu et al., 2021; Szász et al., 2021; Palea & Santhià, 2022; Beier et al., 2022; Lukin et al., 2022).

There are some authors that focus on a comparative analysis of competitors in the automotive industry (Scavarda et al., 2009; Shah & Regassa, 2010; Lui et al., 2018; Gorgoni et al., 2018; Mordue & Sweeney, 2020; Lukin et al., 2022). Some of them in research focuse on trends in the automotive industry globally or in individual economies (Truett & Truett, 2007; Salihoglu & Salihoglu, 2016; Saidani et al., 2018; Masondo, 2018; Albulescu et al., 2021).

Accurate forecasting of stock prices is a very challenging task due to the volatile and non-linear nature of the financial stock markets. In recent literature, there are authors who deal with the prediction of the share price of automotive companies, using different methods or their combination (Nguyen et al., 2019; Yu & Yan, 2020; Anand, 2021; Rakhra et al., 2021). Scott (1985) for the stock price prediction in its research combined regression analysis and the Monte Carlo method. Estember and Maraña (2016) used a combination of Monte Carlo and artificial

neural networks. There are many authors that implement artificial intelligence for stock price prediction (Ray et al., 2018; Sangeetha et al., 2021; Chopra & Sharma, 2021). In their research, some authors (Vijh et al. 2020; Mokhtari et al., 2021) focused on stock price prediction using machine learning techniques.

Some authors (Fathi Vajargah & Shoghi, 2015) used the Monte Carlo method for predicting the stock market index and the value of total risk, while others used this method for stock returns prediction (Kumar & Yadav, 2021). Azis et al. (2021) used the Monte Carlo method for the prediction of the movement of the net asset value. Hersugondo et al. (2022) used the Monte Carlo method for stock price prediction and prediction of some stock indexes.

Based on the given literature review, it can be stated that there is no paper that deals with the prediction of stock prices in the automotive industry using the Monte Carlo method. In this respect, the contribution of this work resides in the different approaches and methods used. In this paper, the stock price prediction will be performed based on the Monte Carlo method using MATLAB software for Tesla, Inc. In the following, the methodology used in the research will be explained, as well as the results of the simulation.

3. DATA AND METHODOLOGY

3.1. Data

The share price prediction for Tesla was created based on historical data available on the Yahoo Finance website. Stock market data is publicly available for all companies within a single stock market. These data are displayed on a daily, monthly, or quarterly basis. As trading on the stock market is a dynamic process, stock markets provide data related to the opening and closing prices, which may be different. Also, the trading volume may differ, too. Since studies usually use the Adj. Price, i.e., the adjusted closing price, to analyse companies on the stock market (from the point of view of the share price), this study will also use this price type as the input data for the analysis.

Monte Carlo analysis focuses on the analysis of stochastic data. Thus, the first step in the simulation is to determine the type of data that is included. Here, the historical data was used for the prior three years (22 April 2020 – 22 April 2023, total 756 trading days at Nasdaq) as the automotive market is dynamic and prior changes may not be relative to the future trends.

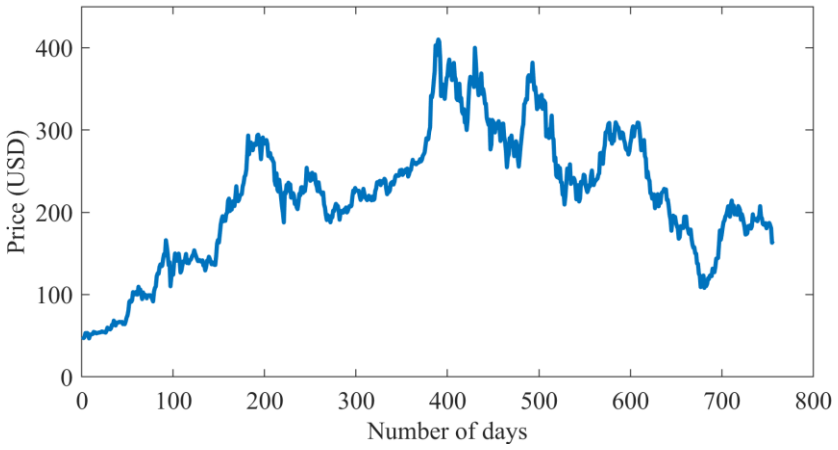


Figure 3. Tesla stock price movement for period 22 April 2020 – 22 April 2023 (Adjusted to Yahoo Finance data)

Figure 3 presents that the stock price movement for the Tesla company for the observed period has a stochastic character, as there can't be a clearly identified data trend for the observed period. Therefore, this data is suitable for running the Monte Carlo price prediction. For the observed period, some statistical data is presented in Table 2.

Table 2. Descriptive statistic values for Tesla stock prices for the observed period (Authors)

Data type for observed period	Maximum price	Minimum price	Average price	Standard deviation
Data value (USD)	409.9700	46.7547	219.8989	80.1993

Based on the data presented in Table 2 it can be noticed that for the observed period stock price had significant changes as the minimum price was 46.75 USD, while the maximum was 409.97 USD, and the average price for the observed period is approximately 220 USD.

3.2. Methodology

The Monte Carlo method is a numerical method for solving the most complex requirements. It is a statistical method that was invented in 1946 by Stanislaw Ulam while he was working on the development of nuclear weapons. As it is a secret project, it got its name from the Monte Carlo casinos where's Ulama's uncle often gambled (Crnjac-Milić & Masle, 2013), and it is believed that the casino was also the inspiration for the creation of this method. The basis of this method is the creation of randomness and the process of repetition.

Stanislaw Marcin Ulam, Enrico Fermi, John von Neumann, and Nicholas Metropolis are considered the first authors who gave importance to this method and its application. Ulam applied this method to games of chance. After extensive research, he managed to develop the pattern into a two-dimensional game based on very simple rules. His work was the basis for the development of far more complex methods in engineering. The potential of this method was soon recognized by John von Neumann, who wrote a program for the first computer, ENIAC, which was used to solve the problem of neutron diffusion using the Monte Carlo method (Metropolis, 1987).

Hertz (1964) is one of the authors who analyzed the potential of using the Monte Carlo Method (MCM) in the field of economics. He found certain peculiarities of the Monte Carlo method and gave an answer to the question of whether there is a way of risk analysis that can help managers make wise decisions, launch new products, modernize plants or avoid overloading of technical capacities. Mathematical formulas that guarantee a uniform rate of return are not enough. The author emphasizes the type of data used and the specific combination of variables, such as cash flow and return that can lead to the routine application of risk analysis in everyday business or in any decision-making process.

Monte Carlo simulation is a method of analysis based on artificially recreating a random process (usually using a computer), running it multiple times, and directly observing the results (Barreto & Howland, 2006). Very simple as well as very complex problems can be solved by simulation. Some problems can be solved manually. However, most require the use of software, such as Excel, R Studio, MATLAB, and similar. Without these programs, solving certain problems would take a very long time.

Monte Carlo simulation i.e. stock price prediction for the future period of one year (the average number of trading days on the stock exchange is 252, so that value is considered representative) is performed using the MATLAB software. The prediction is made individually for the sequences (quarters) of the prediction period. The prediction period is divided into

quarters. Therefore, for the 10,000 outcomes the stock price prediction is done for period of 63 days, 126 days, 189 days, and 252 days respectively.

The prediction is made individually for the selected periods. Based on the corresponding code, the normalized daily increase in the share price is first computed, as well as the mean value and standard deviation for these data. Since this method of prediction is based on probability, the next step is the generation of random numbers. To generate random numbers, a function that recognizes the normal distribution of the numbers is used. Those random numbers represent simulated price increases for the future period based on which the price forecast for the future period is made.

The figures are created according to simulated prices whose interpretation will be set out in this paper.

4. RESULTS AND DISCUSSION

Stock price prediction for Tesla is done based on the three-year-old historical data for the future period of one year on a quarterly basis. As approximately one trading year has 252 working days, the prediction has been done for 63 days (one quarter), 126 days (two quarters), 189 days (three quarters), and for the whole trading year (252 days). The results of stock price prediction for the observed period are presented in Figure 4.

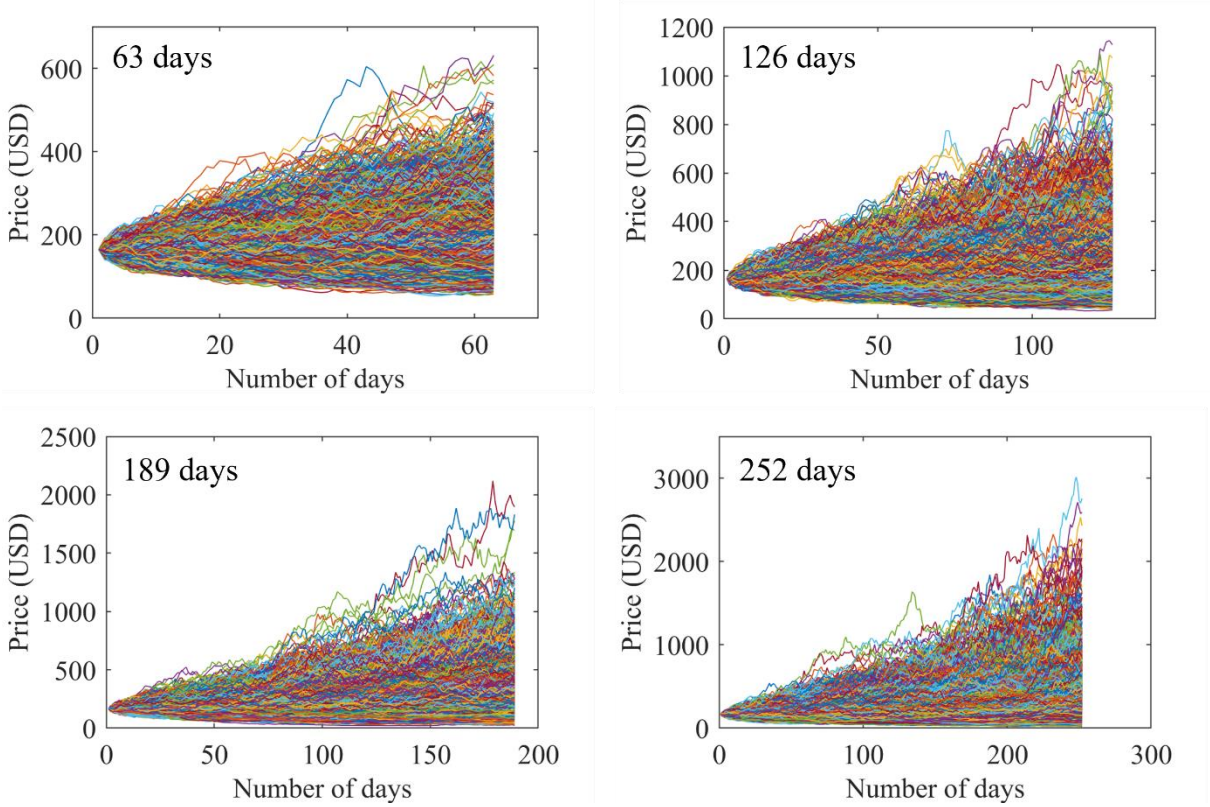


Figure 4. Stock price prediction results for predicted period of 63 days, 126 days, 189 days, and 252 days and 10,000 outcomes (Authors)

Figure 4 shows the stock price prediction results for four future quarters. The x-axis presents the number of days in the future (prediction period), and the y-axis presents simulated prices. All predictions are made based on the 10,000 cases (simulations) as the more simulations are done, the more precise the results are. Taking into consideration that the historical results

are already described as stochastic and with great price volatility, the simulation results vary, taking into consideration the prediction period. The results show that the longer the prediction period is, the greater the possibility for higher stock prices.

Figure 5 presents the distribution of simulated share prices on days 63, 126, 189, and 252. The values on the x-axis indicate the most common values of the prices of the simulated actions, whereas the y-axis reflects the number of times each price is repeated. In addition, the figure illustrates the normal distribution of the resulting data.

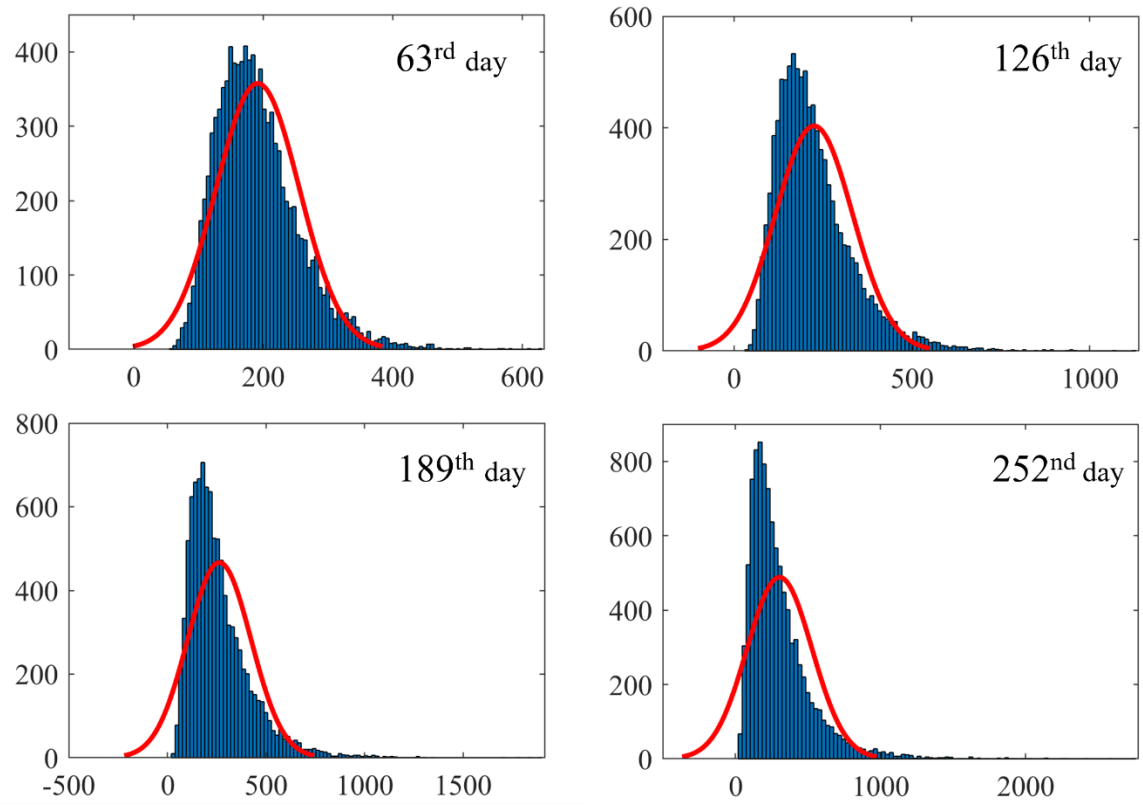


Figure 5. Distribution of simulated share prices on days 63, 126, 189, and 252 for 10,000 outcomes (Authors)

By observing the most frequently predicted prices, it is noticed that the difference in the average predicted prices exists even though the overview periods are short. Table 3 presents more detailed data on price volatility for all observed periods.

Table 3. Simulated price volatility for the observed period and 10,000 outcomes (Authors)

Price (USD)	Prediction period			
	63 days	126 days	189 days	252 days
Minimum	53.7133	32.4338	19.9660	20.4021
Average	177.7958	193.9756	210.9434	227.9592
Maximum	630.8688	1,144.3000	2,119.8000	3,013.4000

Based on the values shown in Table 3 it can be noticed that the longer the period of prediction is, the wider the range in price will be. Based on the historical values, if the prediction is for one quarter (63 working days) the price will vary between approximately 53 USD and 630 USD, while the average price would be approximately 178 USD. In the prediction period is two quarters (126 days), the price will vary in the range of 32 USD minimum, and 1,144

USD maximum. In this case, the most probable average price will be approximately 193 USD. For the prediction period of 189 days or three quarters, the price varies more. The price range that is determined is between approx. 20 USD (minimum) and approx. 2,120 USD (maximum). In this scenario, the average price, and at the same time the most expected, is about $211. For the longest forecast period, the price fluctuates the most. The price range is between about 20 USD and 3,013 USD. However, the average price for this period is about 228 USD. Compared to the historical data, for which an average price of about 220 USD was calculated, the average price for the longest forecast period comes closest to this value.

Additional analysis related to this simulation can be done by comparing the historical (input) data with the obtained results. Comparing them, it would be noticeable the variety of different scenarios. Figure 6 presents the overall view of historical and obtained data for the period of the whole year.

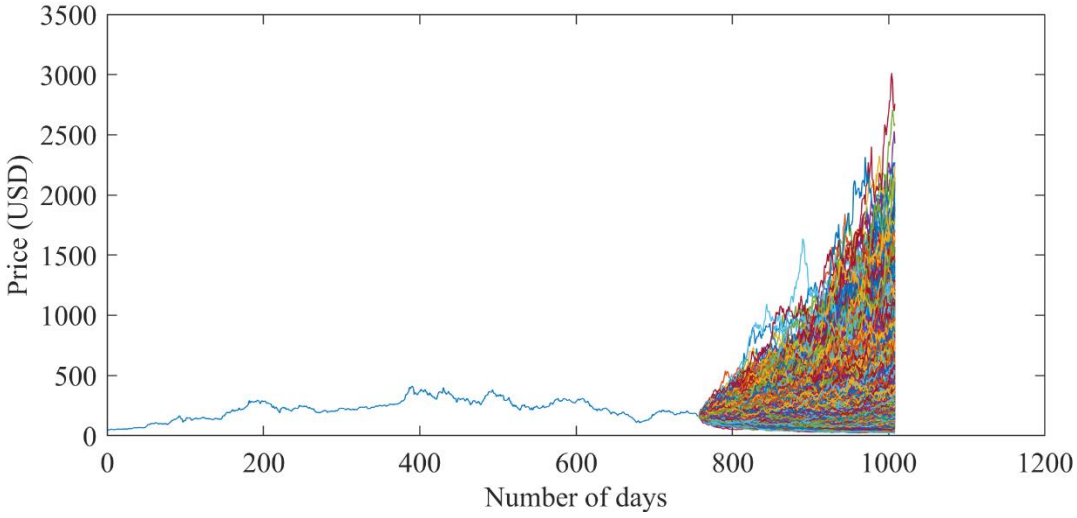


Figure 6. Summarized historical data and predicted prices for the observed period of 252 days and 10,000 outcomes (Authors)

5. CONCLUSION

The automotive industry market has always been very specific. Strong competition between manufacturers who offer different products to their customers has characterized it. Today, this market is even more demanding, as the principle of the products offered on it is fundamentally changing. The electric cars that are on the market today are far from the classic cars in terms of their characteristics, but the number of models and manufacturers of these innovative cars is increasing with time. In other words, this market is still in its early stage.

In this article, a forecast of the stock prices of a company whose primary products are electric cars was made. The Tesla company is one of the pioneers in the production of electric cars. Historically, this company has been in business for about as long as electric car production has been in development. In such a short period, this company attracts a lot of attention from stakeholders. For this reason, it was selected for analysis. The forecast of this company's stock prices was made for one year, i.e. for 252 trading days, based on three years of historical data on the development of stock prices. MATLAB software was used for the forecast, in which a simulation based on the Monte Carlo method was performed.

To see how the length of the forecast period affects the future, the simulation was performed for four different periods (63 days, 126 days, 189 days, and 252 days), and for each one 10,000 cases (possible outcomes) were run. The results of the simulation performed showed

that the longer the forecast period, the greater the deviations from the historical data. In other words, a longer forecast period will result in a wider range of possible price movements in the future, as you can see in Table 3. Table 3 also shows that the average price also depends on the length of the forecast period. There is a direct correlation between the length of the forecast period and the level of the average price. It is also interesting to note that the average price for the forecast periods of 189 and 252 days is close to the average price calculated based on historical data (see Table 2).

Considering that this method is based on probabilities, it is ungrateful to expect that its application will lead to accurate predictions. Moreover, the forecast is based on historical data, so it reflected any sudden price change in the past as a possible jump or fall in the future. On the other hand, the uncertainty of future events cannot be taken into account when using this method.

The final conclusion that can be drawn based on the analysis performed is that, for the forecast period of one year, this method provides values that do not differ significantly from historical values and reflect the direction of price movements in the future. When uncertainty in the future is excluded, this method can provide investors with satisfactory guidance on whether to invest in a company. The results of this analysis show that the price of Tesla stock will continue to rise in the future, so it is worth investing in it. It is recommended to make the final investment decision based on several analyses to compensate for the shortcomings of each forecasting method.

REFERENCES

Albulescu, C. T., Tămășilă, M., & Tăucean, I. M. (2021). The nonlinear relationship between firm size and growth in the automotive industry. Journal of Industry, Competition and Trade, 21(3), 445-463.

Anand, C. (2021). Comparison of stock price prediction models using pre-trained neural networks. Journal of Ubiquitous Computing and Communication Technologies (UCCT), 3(02), 122-134.

Azis, M., Ilmi, Z., Hakim, Y. P., Qodri, M., & Darma, D. C. (2021). 'Monte Carlo'Simulation Predicting on the Movement of Investments–During the Covid Pandemic in Indonesia. JDM (Jurnal Dinamika Manajemen), 12(2), 262-274.

Barreto, H., & Howland, F. M. (2006). Introductory econometrics. Cambridge University Press.

Beier, G., Kiefer, J., & Knopf, J. (2022). Potentials of big data for corporate environmental management: A case study from the German automotive industry. Journal of industrial ecology, 26(1), 336-349.

Chopra, R., & Sharma, G. D. (2021). Application of artificial intelligence in stock market forecasting: a critique, review, and research agenda. Journal of Risk and Financial Management, 14(11), 526.

Crnjac-Milić, D., & Masle, D. (2013). The possibility of applying the Monte Carlo method on the example of an agro-economic problem when making decisions under conditions of risk. Ekonomski vjesnik, 309-314. (In Serbian)

Estember, R. D., & Maraña, M. J. R. (2016). Forecasting of stock prices using Brownian motion–Monte Carlo simulation. In International Conference on Industrial Engineering and Operations Management (pp. 8-10).

Fathi Vajargah, K., & Shoghi, M. (2015). Simulation of stochastic differential equation of geometric Brownian motion by quasi-Monte Carlo method and its application in

prediction of total index of stock market and value at risk. Mathematical Sciences, 9, 115-125.

García-Machado, J. J., & Martínez-Ávila, M. (2019). Environmental performance and green culture: The mediating effect of green innovation. An application to the automotive industry. Sustainability, 11(18), 4874.

Gohoungodji, P., N'Dri, A. B., Latulippe, J. M., & Matos, A. L. B. (2020). What is stopping the automotive industry from going green? A systematic review of barriers to green innovation in the automotive industry. Journal of Cleaner Production, 277, 123524.

Gorgoni, S., Amighini, A., & Smith, M. (2018). Automotive international trade networks: A comparative analysis over the last two decades. Network Science, 6(4), 571-606.

Haas, T. (2021). From green energy to the green car state? The political economy of ecological modernisation in Germany. New political economy, 26(4), 660-673.

Hersugondo, H., Ghozali, I., Handriani, E., Trimono, T., & Pamungkas, I. D. (2022). Price index modeling and risk prediction of sharia stocks in Indonesia. Economies, 10(1), 17.

Hertz, D. B. (1964). Risk Analysis in Capital Investment. Harvard business review, 95-106.

Hu, S., Yang, J., Jiang, Z., Ma, M., & Cai, W. (2021). CO2 emission and energy consumption from automobile industry in China: decomposition and analyses of driving forces. Processes, 9(5), Available at: https://www.mdpi.com/2227-9717/9/5/810, Retrieved: November 2022.

Kumar, P., & Yadav, A. D. (2021). A Prediction Modelling For Stock Returns: Analytical Study With Reference To Automobile Sector In India. Dr. Dy Patil B-School, Pune, India, 265.

Liu, Y., Blome, C., Sanderson, J., & Paulraj, A. (2018). Supply chain integration capabilities, green design strategy and performance: a comparative study in the auto industry. Supply Chain Management: An International Journal.

Lukin, E., Krajnović, A., & Bosna, J. (2022). Sustainability Strategies and Achieving SDGs: A Comparative Analysis of Leading Companies in the Automotive Industry. Sustainability, 14(7), 4000.

Masondo, D. (2018). South African business nanny state: the case of the automotive industrial policy post-apartheid, 1995–2010. Review of African Political Economy, 45(156), 203-222.

Meckling, J., & Nahm, J. (2019). The politics of technology bans: Industrial policy competition and green goals for the auto industry. Energy Policy, 126, 470-479.

Mokhtari, S., Yen, K. K., & Liu, J. (2021). Effectiveness of artificial intelligence in stock market prediction based on machine learning. arXiv preprint arXiv:2107.01031.

Mordue, G., & Sweeney, B. (2020). Neither core nor periphery: The search for competitive advantage in the automotive semi-periphery. Growth and Change, 51(1), 34-57.

Nguyen, H. V., Naeem, M. A., Wichitaksorn, N., & Pears, R. (2019). A smart system for short-term price prediction using time series models. Computers & Electrical Engineering, 76, 339-352.

Palea, V., & Santhià, C. (2022). The financial impact of carbon risk and mitigation strategies: Insights from the automotive industry. Journal of Cleaner Production, 344, 131001.

Rakhra, M., Soniya, P., Tanwar, D., Singh, P., Bordoloi, D., Agarwal, P., ... & Verma, N. (2021). Crop price prediction using random forest and decision tree regression:-a review. Materials Today: Proceedings.

Ray, R., Khandelwal, P., & Baranidharan, B. (2018, December). A survey on stock market prediction using artificial intelligence techniques. In 2018 International Conference on Smart Systems and Inventive Technology (ICSSIT) (pp. 594-598). IEEE.

Rovinaru, F. I., Rovinaru, M. D., & Rus, A. V. (2019). The economic and ecological impacts of dismantling end-of-life vehicles in romania. Sustainability, 11(22), 6446.

Saidani, M., Yannou, B., Leroy, Y., & Cluzel, F. (2018). Heavy vehicles on the road towards the circular economy: Analysis and comparison with the automotive industry. Resources, Conservation and Recycling, 135, 108-122.

Salihoglu, G., & Salihoglu, N. K. (2016). A review on paint sludge from automotive industries: Generation, characteristics and management. Journal of environmental management, 169, 223-235.

Sangeetha, M., Priya, R. M., Elias, J., Pradeep, D., Mamgain, S. W., & Gulati, K. (2021). Techniques Using Artificial Intelligence To Solve Stock Market Forecast, Sales Estimating And Market Division Issues. Journal Of Contemporary Issues In Business And Government|, 27(3), 210.

Scavarda, L. F., Schaffer, J., Scavarda, A. J., da Cunha Reis, A., & Schleich, H. (2009). Product variety: an auto industry analysis and a benchmarking study. Benchmarking: An International Journal.

Scott, L. O. (1985). The present value model of stock prices: regression tests and Monte Carlo results. The Review of Economics and Statistics, 599-605.

Shah, A. B. H. A. Y., & Regassa, H. (2010). Return on quality—quality's impact on customer satisfaction, revenue growth, profitability and cost efficiency. A cross national comparative analysis of Japanese and American manufacturers in the auto industry. Marketing Management Journal, 20(2), 163-179.

Szász, L., Csíki, O., & Rácz, B. G. (2021). Sustainability management in the global automotive industry: A theoretical model and survey study. International Journal of Production Economics, 235, 108085.

Tesla. (2021). Impact report 2021. Available at: https://www.tesla.com/ns_videos/2021-tesla-impact-report.pdf. (April 2023).

Tesla. (nd). Available at: https://www.tesla.com/. (April 2023).

Truett, L. J., & Truett, D. B. (2007). A cost-based analysis of scale economies in the French auto industry. International Review of Economics & Finance, 16(3), 369-382.

Vijh, M., Chandola, D., Tikkiwal, V. A., & Kumar, A. (2020). Stock closing price prediction using machine learning techniques. Procedia computer science, 167, 599-606.

Wang, M. X., Xiao, Z., Peng, H. G., Wang, X. K., & Wang, J. Q. (2022). Stock price prediction for new energy vehicle enterprises: An integrated method based on time series and cloud models. Expert Systems with Applications, 208, 118125.

Yahoo Finance. (2023). Available at: https://finance.yahoo.com/quote/TSLA?p=TSLA. (April 2023).

Yu, P., & Yan, X. (2020). Stock price prediction based on deep neural networks. Neural Computing and Applications, 32(6), 1609-1628.

Volume XIX, Issue (1) (2023) 369-377

International May Conference on Strategic Management

THE NEW TECHNOLOGICAL SOLUTION FOR SPORTS ACTIVITIES IN NON-PROFESSIONAL ORGANIZATIONS IN THE CONTEXT OF THE GREEN BUSINESS: CHALLENGES AND PERSPECTIVES

Daniil Kulikov [1,2*], Ishgaley Ishmuhametov [2]

[1]Claude Bernard University Lyon 1, Villeurbanne, Rhône-Alpes, France; [2] Transport and Telecommunication Institute, 1 Lomonosova Street, LV-1019, Riga, Latvia

Abstract: In recent years, sports organizations related to winter sports have increasingly focused on environmental sustainability. The top management of sports clubs aims to use only ice arenas that adhere to the principles of the green economy, considering the impact of global warming. Major sports federations and clubs also recognize the rapidly growing sector of environmental science in the sports industry, as sports facilities have a significant negative impact on the environment. In this context, the use of artificial ice is considered a new way of providing ice services for the sport population with minimal environmental impact and reduced costs. This research aims to study the potential of using new technologies, particularly artificial ice, in accordance with the principles of a green economy, and to develop recommendations for sports clubs for the development of winter games on ice arenas in the future. The authors employed empirical methods such as questionnaires and structured interviews during the study. A total of 3 surveys were conducted with potential service consumers and providers of natural and synthetic ice: 132 ice hockey players, 12 representatives of ice arena management from Latvia and France, and 5 experts promoting the use of synthetic ice. The authors hope that their conclusions and recommendations will be of practical importance to investors, coaches, and managers of ice arenas, as well as all interested parties associated with winter sports and ice arenas focused on the principles of a green economy.

Keywords: environmental protection, new technological solution, artificial ice, modern ice arenas, modern ice rinks

1. INTRODUCTION

One of the most important tasks for leaders of sports clubs, ice arenas, and companies serving sports events nowadays is to develop ways for further development based on national strategies and the foundations of building a "green" economy. A green economy aims to reduce environmental risks and ecological scarcities, and to achieve sustainable development without degrading the environment. It is closely related to ecological economics, but has a more politically applied focus (UNEP, 2011). Experts at the United Nations Environment (UNEP) view the green economy as economic activity "that enhances human well-being and social justice, while significantly reducing environmental risks and environmental degradation» (UNEP, 2021).

[*] *Corresponding author: daniil.kulikov@etu.univ-lyon1.fr*

Most sports organizations related to winter sports pay great attention to the environment. Considering the global warming situation, top management of sports clubs strives to use only those ice arenas where the principles of the "green economy" are taken into account. Managers of sports organizations initiate ongoing expert assessments, scientific research, and discussion of the impact of mass sports winter events on the environment, and introduce environmentally friendly modern technologies. This is understandable because commercialization and the Business Intelligence of the sports industry are becoming important features of modern society, as well as modern approaches in the environment sector (Cotts et al., 2010).

The increased interest of the leadership of sports organizations towards new technologies in the construction of new sports centers, expansion, and renovation of ice rinks is giving new opportunities for business. Leaders of major sports federations and clubs are also aware that the environmental impact of the sports industry is a rapidly growing sector of humanity, since sport facilities bring devastating environmental impact to our generation and affect our sustainable environment negatively. Some authors in their research have measured the impact and consequences of ice rink maintenance on the environment (Karampour, 2011; Schulz, 2012). In this case, the management of the clubs as customers and stakeholders is trying to use the concept of artificial ice, which can be categorized as a completely new way of ice service for the sport population with minimum impact on the environment and significant cost savings.

The aim of this research is to study the perspectives of using new technologies, particularly artificial ice, in accordance with the concept of a green economy to develop recommendations for sports clubs for the development of winter games on ice arenas in the future. During the analysis, the authors draw attention to the destructive impact of large sports facilities on the environment, the need to collect independent research data, and the need to conduct data analysis to be able to conduct more thorough research and make better recommendations. The authors agree with I. Yatskiv's point of view that "The concept of Data Analysis is becoming increasingly popular as a business information management tool where it is expected to reveal knowledge structures that can guide decisions in conditions of limited certainty" (Yatskiv, 2020). This study aims to determine if replacing natural ice with artificial (synthetic) ice will maintain the quality of sports activities for a non-professional group of population.

The following questions were formulated:

RQ1: What is the environmental impact of sports facilities and massive winter sports events?

RQ2: Are there any advantages to using artificial ice by sports clubs in ice arenas for hockey and winter sports? Can the quality of training, leisure activities, and sports games be maintained?

2. LITERATURE REVIEW

The need to transform the activities and development strategies of sports organizations is confirmed by the fact that, in several countries in the pan-European region, the strategy for building a "green" economy has become an integral part of a broader political strategy, such as a strategy for sustainable development (Belgium/Flanders, Czech Republic, France, Lithuania, Romania). In other cases, such strategies are formulated within the framework of environmental policy (Belgium/Flanders, Republic of Moldova, Seventh Environmental Action Program of the European Commission) or other policy directions, often within the framework of energy policy (Hungary, Italy) (Alinov, et al., 2016).

The problems of global warming and water scarcity on Earth have made society think about the environmental friendliness of ice rinks. Ice rinks have been well-established for years, becoming a popular destination for families' leisure. However, when these rinks were built, energy-efficient solutions were not on the horizon. The issues of the green economy have made the management of sports clubs and ice arenas rethink the environmental friendliness of ice rinks. There has been much discussion centered around the influence of climate change on hockey. However, only a few people have discussed and measured how hockey and other businesses around the rink interact with the environment. The relationship may not seem significant at first within just one ice arena. However, it is far from being insignificant when we consider over 9,000 ice arenas that are operating on average for 11 months per year (Statista research, 2019).

The term resource management at sports facilities, particularly ice rinks, was analyzed by Rogstam and Mazzotti (2014). This research calculated that an average ice rink uses 1000 MWh/yr. On the other hand, the same authors concluded that inefficient ice rinks can use up to 2000 MWh/yr, whereas analytical research by Karampour (2011) calculated that the most efficient ice rink systems can use 700 MWh/yr. By doing the math, 1,000 megawatts will be equal to about 6.6 billion kWh in a year, which is equivalent to the amount of power consumed by 900,000 homes in the Northeast but only 460,000 homes in the south. According to analytical evidence research by Schulz regarding water consumption by the machine that spreads the water on the ice surface, further machine called Zamboni, it takes up to 270 gallons of water, which equates to 1022 liters of water each time the machine prepares the ice for the skating session (Schulz, 2012). According to the U.S institute of medicine, it was determined that an adequate daily fluid intake is about 3.7 liters of fluids a day for men and about 2.7 liters of fluids a day for women (Institution of Medicine - IOM, 2005).

Therefore, just one resurfacing of the ice rink can maintain a healthy lifestyle for water intake for men for 276 days and 378 days for women. Zamboni has to resurface ice daily from 10-15 times per day, and the ice rink usually operates between 9-12 months. The ice-making water comes out below where the driver is seated on the Zamboni and is spread out over the ice, creating a smooth surface for skaters. However, there was a discussion on the CJAD 800 AM News talk Radio with Kretzschmar that there is an ecologically sustainable alternative ice rink solution that functions without water, energy consumption, and no carbon emission. Synthetic (artificial) ice has a total of 10 years warranty, which gives the opportunity to flip the surface on the other side and use the ice surface again for another 10 years (Kretzschmar, 2020).

While reviewing worldwide ice rink statistics for 2019 regarding the number of ice rinks across the world that operate on a regular basis, the author found 7189 indoor ice arenas with natural ice and 9109 outdoor ice rinks that mainly require water resources to resurface the ice. Analyzing climate change in North America (Canada) and the scope of winter sports, we found that over the past 100 years, the number of winter days has significantly decreased, but the average temperature has increased by 2°C on average. Reviewing scientific research, it was predicted that historically, Rideau Canal’s skating season lasted around 61 days, which is 9 weeks. By 2020, it would shrink by 29% and will lose 67% (41 days) by 2050. By the end of the 21st century, with continuing high emission scenarios, the skating season will be reduced by 87% (Suzuki, 2009).

The resource costs for opening and subsequent maintenance are being addressed, among other things, by the International Olympic Committee and the International Ice Hockey Federation. The ultimate goal for the model is to use innovative technologies to save water, reduce emissions into the atmosphere, and lower overall energy used at hockey ice arenas. The main goal is to conserve the future opportunity and let future generations play hockey.

The management of sports clubs should provide training and scheduled performances for hockey players, skaters, and figure skaters throughout the year. This always requires special conditions for the ice surface of the rink, maintaining it constantly in perfect condition, and maintaining a special temperature regime. In the warm season or warm regions, it is necessary to build expensive indoor ice arenas, provide appropriate equipment, and hire service personnel.

One of the proposed solutions is synthetic ice. However, this option for the environment also requires research. It is estimated that synthetic ice has around 90% of the glide factor compared to natural ice (Kennedy & Watkins, 2012). The majority of synthetic ice rinks like to use liquid surface enhancements, which help develop the quality of synthetic ice products and further reduce drag on the skate blade over the artificial surface. Nevertheless, most synthetic ice rinks allow skating without a particular liquid substance (Plastics on ice: How plastics advance ice hockey, 2018).

However, while assessing the perspective use of artificial ice sport services, the authors encountered the following questions:

- there is not enough information on how much natural ice and artificial ice consume resources in Latvia and France, making it harder to compare perspectives of artificial ice from an economical and environmental point of view;
- there is not enough reliable and independent information from elite ice hockey players and their professional opinion regarding the quality of artificial ice;
- there is not enough independent professional opinion on whether artificial ice can be a good solution for young athletes who face a lack of training ice time all year round and especially in the summer time;
- there is no data regarding how the general public would potentially perceive the notion of changing the natural ice surface to artificial ice rinks for non-professional groups of athletes.

3. RESEARCH METHODOLOGY

The aim of our research was to study the perspectives of using new technologies, in particular, artificial ice, in accordance with the concept of a green economy, to develop recommendations for sports clubs for the future development of winter games on ice arenas. During the study, the authors applied such empirical methods as questionnaires and structured interviews.

It was important for us to understand the attitude of various population groups towards artificial ice, including professional athletes, which was taken as a basis for identifying the prospects for the development of this entertainment sphere through the use of artificial ice for mass skating.

A total of three surveys were conducted with potential service consumers and providers for natural and synthetic ice. The complexity of the work lay in ordering all three groups of respondents, since in our opinion, representatives of ice rinks tend to consider natural ice an irreplaceable product, while representatives of the new artificial ice product actively propose a replacement for natural ice in the form of synthetic ice and see many-sided benefits when using artificial turf. However, in the authors' opinion, the most critical group of this study is professional athletes, who are ready to share their independent opinion based on their acquired experience of playing hockey on different surfaces, thereby assessing the prospects for using artificial surfaces.

In the first group, 132 athletes with experience in playing ice hockey were interviewed. In the second group, representatives of the management of an ice arena with natural ice were interviewed using the example of two countries, Latvia and France. In Latvia, six respondents were interviewed, who were specialists with work experience in the range of 8-16 years, while in France, six respondents with work experience in the range of 5-20 years were interviewed. In the third group, experts providing and promoting a new service of synthetic ice were interviewed, with five respondents having three years of experience in this service sector.

The survey was conducted anonymously, subject to privacy and data protection policies. Participation was optional.

4. RESEARCH RESULTS

The main group of respondents has experience playing hockey in the range of 5-25 years or more, which totals 92.4% of the surveyed respondents. Most of the surveyed respondents have the status of elite athletes (33.1%) or athletes of the second level (33.3%), who also belong to professional athletes performing in the second divisions. This selection of respondents is able to give a more structured and professional assessment of the new artificial ice service since the respondents in these groups have extensive experience in skating.

The study results show that the majority of professional athletes, as well as the predominant amount of the general public, are widely supporting the opportunity to skate on synthetic ice. One of the key survey criteria was to understand whether the surveyed respondents have experience skating directly on artificial ice. 72% answered positively to this question, which gives a clearer picture of the study when analyzing the subsequent questions. Among the respondents, it was calculated that 61.6% had a positive experience while skating on artificial ice, and only 10.4% of the interviewees had negative experience with synthetic ice, whereas 28.0% were not able to measure this criteria as they had no skating experience with synthetic ice. During the study, we found that only 11.2% believed that this coverage can be assessed as excellent, 10.4% believed that this coverage met the criterion very well, and the majority of respondents (23.2%) agreed with the assessment well. The slightly lower indicators of the group who rated the artificial ice as normal were 16.8% of the total number of respondents (Figure 1).

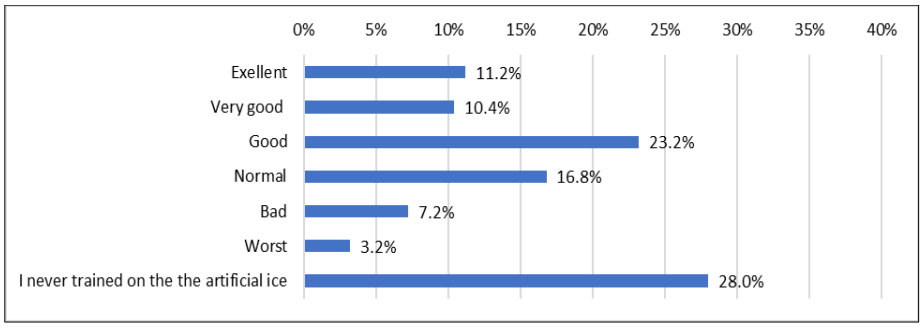


Figure 1. Perception after skating on synthetic ice

Analyzing another factor which implies readiness to use synthetic ice among professional ice hockey players, the authors defined that 86.5% of professional ice hockey players are ready to substitute natural ice with synthetic ice during the summer time, whereas 13.5% are not ready to use synthetic ice under any circumstances (Figure 2).

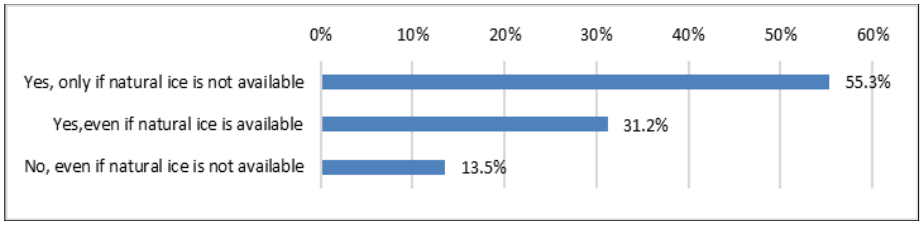


Figure 2. Readiness to skate on synthetic ice

During this survey, the authors were able to reveal that artificial ice can be considered a promising direction for professional athletes in the summer, as well as for non-professional groups of the population. With the aim of finding a possible solution to the problem of lack of ice time for novice athletes, the authors found that 62.7% of respondents agreed with the opinion that artificial ice can replace natural ice but only partially. Only 9% of respondents believe that training on natural ice can be completely replaced by training on artificial ice, while 6% of respondents believe that skating on artificial ice can harm the development of the technical characteristics of a growing athlete.

In the final question, the respondents were asked to share their views on the prospect of using artificial ice. It is worth noting that more than 90% of respondents expressed positive aspects of using artificial ice, correlating the possibility of using artificial ice with a good tool to improve shooting technique, puck handling, as well as a number of expert opinions suggesting that during the off-season, this is a good opportunity to maintain muscle corset in the usual hockey mode, which helps reduce the risk of injury when returning to ice training after the off-season.

Taking the economic factor into account, the authors have defined that maintaining a low price for synthetic ice is a crucial criterion for ice rink managers today. It costs less than 10 euros per hour to maintain the synthetic ice surface, whereas the price for natural ice varies between 70-110 euros per hour during the summer. That's the main reason why many ice rink managers decide to melt the ice surface between 1-3 months as the temperature increases and the cost of maintaining natural ice also rises (Figure 3).

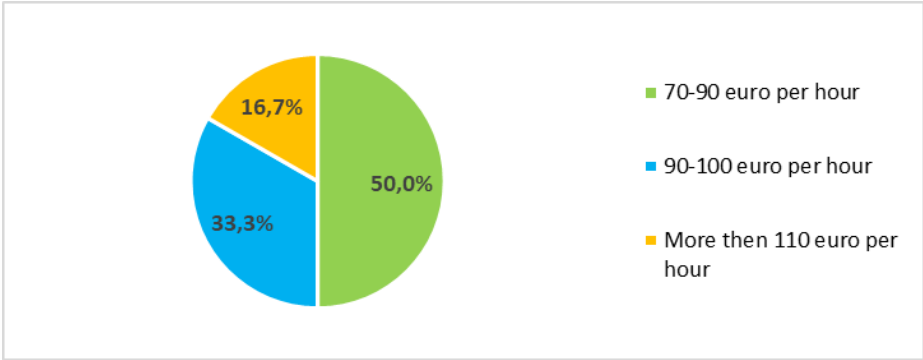


Figure 3. Price ratio for natural ice rink maintenance during the summer

While analyzing the costs for synthetic ice maintenance, the authors defined that its price will be less than 10 euros per hour. This is significantly less expensive compared to natural ice, and this criterion is not dependent on the season of the year. Therefore, the costs will remain stable despite the temperature level outside the arena (Figure 4).

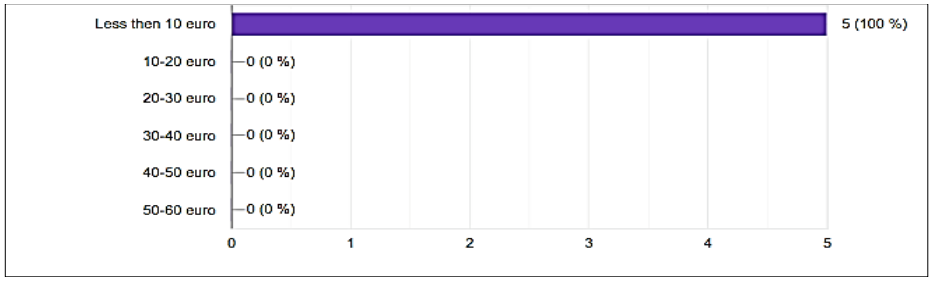


Figure 4. Price ratio for synthetic ice rink maintenance during the summer

Experts in the field of artificial ice were also asked to evaluate the quality of sliding on artificial ice compared to natural ice. Two (40%) of the respondents attributed the sliding quality of artificial ice as equal to 96-97%, while 1 (20%) considered that the quality of sliding is comparable to 98-99%, and also 1 (20%) of respondents attributed the quality of sliding to the criteria of 94-95% and 92-93% (See Figure 5).

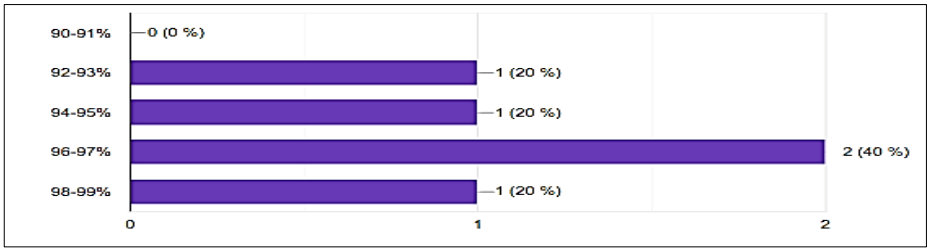


Figure 5. If natural ice have 100% glide, how would you evaluate natural ice vs artificial ice glide?

The authors decided to define the important criteria for the potential of synthetic ice among the general public. At this stage, it was concluded that 100% of the respondents said that non-professional skaters are not able to notice the difference between natural and synthetic ice.

Also, respondents, in their comments on the most common problems with artificial ice, noted that as a result of skating, plastic separates into chips (pieces of plastic). This factor reduces the quality of sliding and subsequently the lifetime of the arena since regular cleaning of the surface is required. However, it can be considered a positive factor that there is no need for specially trained workers to maintain such an arena since any worker, including a robotic machine, can clean the artificial ice. This significantly minimizes the cost and emission of maintaining artificial ice. During the survey, the authors found that 4 (80%) of experts said that synthetic ice does not have a negative impact on nature. From an environmental point of view, the use of artificial ice significantly decreases the devastating influence in the environmental sector compared to natural ice.

5. CONCLUSION

Ice hockey rinks are significant consumers of energy and water, resulting in harmful emissions to the atmosphere, which negatively impact the environment. In contrast, artificial ice rinks have no energy or water consumption and no carbon footprint, making them a green concept.

The authors found that artificial ice has positive prospects among potential consumers, with 86.5% of respondents willing to substitute natural ice for artificial ice for

skating/training purposes during the summer. Additionally, 61.6% of respondents from professional athletes and rink managers had a positive attitude towards synthetic ice, indicating that this modern ice concept can find appropriate use among potential consumers.

Given the lack of ice for training in Riga (Latvia), the authors suggest that it is possible to open a sports school for ice hockey and figure skating based on artificial ice, which can improve technical skills and strengthen the athlete's muscle corset, particularly in the summer when many rinks are melted, and training is limited.

From an economic perspective, the construction of synthetic ice is a much less costly project that pays for itself much more quickly. The use of synthetic ice is also possible 24 hours a day, 7 days a week, without the need for powerful energy generators and water resources. The concept of synthetic ice requires minimal technical means for its installation and maintenance, saving significant sums every day. Additionally, Euro projects aimed at supporting eco-business projects may offer bonuses for using this concept.

In summary, the authors' conclusions may be of practical importance to investors, coaches of sports clubs, and managers of ice arenas, as well as anyone interested in winter sports and ice arenas that are focused on the principles of a green economy.

ACKNOWLEDGMENT

The study involved 132 athletes with experience in playing ice hockey, 12 representatives of the management of an ice arena with natural ice from Latvia and France, and 5 experts providing and promoting a new service of synthetic ice, who volunteered to participate. All participants received information about the study and gave voluntary consent to participate.

REFERENCES

Alinov, M., Orunkhanov, M., & Anufriev, V. (2016). Model of the concept of transition of regions to the "green" economy. Sustainable development and green (low-carbon) economy of regions: problems, opportunities and prospects. Ekb. (in Russian).

Cotts, D., Roper, K., & Payant, R. (2010). The Facility Management Handbook. 71p.

Green economy. (2021). UNEP reference document, available at: http://web.unep.org/greeneconomy/sites/unep.org.greeneconomy/files/ru_ge_employmen.pdf. Accessed (19 January 2023).

Institution of Medicine (IOM). (2005). Dietary Reference Intakes for Water, Postassium, Sodium Chloride and Sulfate. Institution of Medicine Panel on Dietary Reference Intakes for Electrolytes and Water. Washington DC. The National Academics Press.

Karampour, M. (2011.) Master thesis. Measuring and modelling of ice rink loads. Available at https://www.diva-portal.org/smash/get/diva2:478941/fulltext01.pdf.html. Accessed (1 February 2023).

Kennedy, J., & Watkins, W. (2012). How to Invent and Protect Your Invention: A Guide to Patents for Scientists and Engineers. John Wiley & Sons.

Kretzschmar, F. (2020). Radio discussion regarding the sustainable modern ice rink technology.

Plastics on ice: How plastics advance ice hockey. (2018). https://www.plasticsmakeitpossible.com/whats-new-cool/sports-outdoors/plastic-ice-skating-fun-technology-in-any-climate/. Accessed (17 January 2021).

Rogstam, J., & Mazzotti, W. (2014). Ice Rink Dehumidification Systems Energy Usage and Saving Measures. 11th IEA Heat Pump Conference 2014, Montréal (Québec) Canada.

Schulz, J. (2012) Sonoma green business. Environmental values at work. How much does Zamboni consume water. Available at https://schulzmuseum.org/dumpster-diving-and-how-much-water-does-a-zamboni-drink/. Accessed (19 May 2022).

Statista research. (2019). Available at https://www.statista.com/statistics/282353/countries-by-number-of-ice-hockey-rinks/. Accessed (25 January 2023).

Suzuki, D. (2009). On thin ice. Winter sports and climate change. Available at https://davidsuzuki.org/wp-content/uploads/2009/03/on-thin-ice-winter-sports-climate-change.pdf. Accessed (29 January 2023).

UNEP. (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication (advance copy available from http://www.unep.org/greeneconomy).

Yatskiv, I. (2020). Methods of data analysis and business forecasting course, presentation layouts. TSI.

Volume XIX, Issue (1) (2023) 378-384

International May Conference on Strategic Management

SUPPLIER SELECTION IN PRODUCTION SYSTEM

Bojan Stojčetović*, Milan Mišić, Strahinja Đurović

Kosovo and Metohija academy of applied studies, Serbia

Abstract: The importance of adequate supply especially came to the fore during the pandemic of the COVID19 virus, when many production systems had a problem with timely supply, which affected the entire production process and the delivery of final products, and therefore the realized profit as well as customer satisfaction. The selection of an adequate supplier requires the analysis of a large number of criteria, which points to the application of multi-criteria decision-making methods. In theory and practice, a large number of multi-criteria decision-making methods are used, such as analytical hierarchical process, analytical network process, technique for order of preference by similarity to ideal solution, reference ranking organization method for enrichment of evaluations, etc. In this paper, an analytical hierarchical process was applied for the assessment and selection of suppliers. Also, numerous and different decision criteria are used when choosing a supplier, which largely depends on the specific needs and characteristics of the company. Applying the mentioned methodology and using it based on four criteria (quality, price, time, payment flexibility) a ranking list of suppliers was obtained. Also, a sensitivity analysis was conducted to determine whether a change in certain weighting factors leads to a change in the ranking. It was determined that the deviations are within the allowed limits, so the results can be considered relevant.

Keywords: supply, selection, AHP, production system

1. INTRODUCTION

Supplier selection and evaluation is the process of finding the suppliers being able to provide the buyer with the right quality products and/or services at the right price, at the right quantities and at the right time (Hruška et al., 2014). Cooperation with relevant suppliers can greatly influence the success of the company. The importance of supply came to the fore especially during the pandemic of the COVID19 virus. During this period, many production systems were forced to find new suppliers so that the production process could continue without interruption. However, the selection of new suppliers is not at all a simple process. It is necessary to take into account a large number of criteria. Otherwise, the choice can be poor and negatively affect the normal operation and development of production systems/companies. Bearing in mind that for the selection of a supplier, it is necessary to consider a large number of criteria, the application of the multicriteria decision making (MCDM) methods are imposed as a logical choice. Various MCDM methods are applied in theory and practice, such as analytical hierarchical process (AHP), analytical network process (ANP), technique for order of preference by similarity to ideal solution (TOPSIS), preference ranking organization method for enrichment of evaluations (PROMETHEE). One of the most frequently used methods for

* *Corresponding author: bstojcetovic@yahoo.com*

solving various problems is AHP, it is used in numerous fields: energy (Stojčetović et al., 2021), environment (Kurtila et al., 2000), agriculture (Shreshta et al., 2004). Also, AHP is used to select suppliers (Hruška et al., 2014; Angani et al., 2017; Rozi & Herovati, 2018).

2. METHODOLOGY

In this paper, the implementation of the supplier selection process is proposed through the implementation of several steps:

1. Defining the list of potential suppliers
2. Defining the list of decision criteria
3. Evaluation of the criteria
4. Sensitivity analysis
5. Final ranking of suppliers

Due to its simplicity and proven advantages for the assessment of criteria (step 3), this paper will apply the AHP methodology, which is described in more detail in the following chapter.

2.1. Analitycal hierarchy process

The AHP was developed by Thomas Saaty (1980). The AHP methodology can be explained step by step approach as following:

1. In the first step, the problem is formulated in a hierarchical manner. In this step, the aim, main criteria, sub criteria and alternatives should be identified clearly.
2. Paired comparisons are performed and the relative importance are determined.
3. The consistency of pair wise comparison matrices is determined. If the consistency ratio (CR) is equal or smaller than 0.1 value, the comparisons are consistent.
4. In the final step, priorities of alternatives are found by combining the weights of criteria and the ratings of the alternatives.

Table 1. Saaty's 1-9 scale of pairwise comparisons

Intensity of importance	Definition	Explanation
1	Equal Importance	Two activities contribute equally to the objective
3	Moderate Importance	Experience and judgment slightly favor one activity over another
5	Strong Importance	Experience and judgment strongly favor one activity over another
7	Very Strong	An activity is favored very strongly over another
9	Extreme Importance	The evidence favoring one activity over another is of the highest possible order of affirmation
2, ,4, 6, 8	Intermediate results	They are used to present a compromise between the priorities listed above

To perform a pair wise comparison by all relevant criteria/alternatives, an n x n matrix A is formed:

$$A=\begin{pmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \dots & \dots & \dots & \dots \\ a_{n1} & a_{n2} & \dots & a_{nn} \end{pmatrix} \quad (1)$$

where a_{ij} values are obtained using a 9-point scale (Table 1).

Matrix A is a positive reciprocal matrix in which aij represents the relationship of preference of alternative i and in relation to alternative j. The value of a_{ij} is the reciprocal of the value of a_{ji}. That is,

$$a_{ij} = \frac{1}{a_{ij}}. \quad (2)$$

If the pairwise comparisons are consistent, then the elements of the matrix A satisfy the equation:

$$a_{ij} * a_{jk} = a_{ik}, \text{ for each } i, j, k. \quad (3)$$

The weighting factor of the criterion / alternative can be denoted by w_i. If the matrix A is consistent a_{ij} can be represented as

$$a_{ij} = \frac{w_i}{w_j} \text{ for each } i \text{ and } j. \quad (4)$$

Therefore, if A is consistent then it is:

$$A*W=\begin{pmatrix} \frac{w_1}{w_1} & \frac{w_1}{w_2} & \dots & \frac{w_1}{w_n} \\ \frac{w_2}{w_1} & \frac{w_2}{w_2} & \dots & \frac{w_2}{w_n} \\ \dots & \dots & \dots & \dots \\ \frac{w_n}{w_1} & \frac{w_n}{w_2} & \dots & \frac{w_n}{w_n} \end{pmatrix} * \begin{pmatrix} w_1 \\ w_2 \\ \dots \\ w_n \end{pmatrix} = n * \begin{pmatrix} w_1 \\ w_2 \\ \dots \\ w_n \end{pmatrix}. \quad (5)$$

By normalizing the matrix A = $[a_{ij}]$nxn the weight factor is calculated as follows:

$$a^*_{ij} = \frac{a_{ij}}{\sum_{i=1}^{n} a_{ij}}, \quad (6)$$

for each j=1,2,…,n. Then, it is:

$$w_i = \frac{\sum_{i=1}^{n} a_{ij}}{n}, \quad (7)$$

for each j=1,2,…,n.

To determine the level of consistency, Saaty proposed the Consistency Index (CI), which can be calculated according to the following equation:

$$CI = \frac{(\lambda_{max} - n)}{(n-1)}, \quad (8)$$

where λ_{max} is the validation parameter in AHP. The closer the value of λ_{max} is to n, the more consistent the estimate is.

The Consistency Ratio (CR) can be calculated by the following formula:

$$CR = \frac{CI}{RI}, \quad (9)$$

where RI (Random Index) is a random consistency index.

When CR <0.10, the matrix can be assessed as acceptable, otherwise, the matrix should be modified until an acceptable value is reached. Homogeneity of factors within each group, fewer factors in the group, and better understanding of decision problems can improve the consistency index (Saaty, 1993).

3. PROPOSED MODEL APPLICATION

As mentioned in chapter 2, the supplier selection process consists of five steps. This paper presents an example of the application of the proposed model on the example of the production company ABC.

Defining the list of potential suppliers - first of all, the appropriate department of the company should compile a list of all potential suppliers for a certain product or raw material. This entails detailed market research and collection of bids from as many suppliers as possible. It is also recommended to create and constantly update a list of potential suppliers.

Decision making criteria selection - A large number of supplier selection criteria are used in the literature. Table 2 presents some of the applied criteria. However, each company has its own specifics and goals that should be taken into account when choosing decision criteria.

Table 2. Criteria for supplier selection

Criteria	Reference
Quality	(Rahmi & Firman, 2019); (Hruška et al, 2014)
Price	(Rahmi & Firman, 2019); (Hruška et al, 2014)
Time	(Rahmi & Firman, 2019)
Payment flexibility	(Rahmi & Firman, 2019)
Financial situation of supplier	(Hruška et al, 2014)
Service	(Hruška et al, 2014)
Willingness of hold stocks by supplier	(Hruška et al, 2014)
Transport	(Hruška et al, 2014)
Waranty	(Anggani et al., 2017)
Quantity	(Rozi & Herovati, 2018)

For the purposes of this paper, the following criteria were selected:

- **quality** - the quality of semi-finished products and raw materials that are procured will greatly affect the quality of the final products. Bearing in mind the strong competition in today's market, quality is one of the crucial factors that affects sales and, therefore, the survival and development of companies.
- **prices** - in order for the company to be competitive, the prices of their products must be more favorable compared to the competition, which implies that the prices at which they purchase raw material must be competitive and lower than the competition.
- **time** - the importance of delivering the order on time was especially evident during the COVID19 pandemic and delays in deliveries at the global level. In such a situation, many production systems stopped production and delayed product delivery, which had a negative impact on business.

- **payment flexibility** – inflation, high interest rates, high competition affect the availability of sufficient financial resources in many companies. Therefore, the flexibility of payment is also a very important factor when choosing a supplier, because not all companies are able to settle their financial obligations towards suppliers at the time of taking over semi-finished products/raw materials/equipment.

Evaluation of the criteria - can be done using different MCDM methods. In this paper, AHP was used to evaluate the criteria. In the first step, the criteria were evaluated in relation to the decision-making goal (Table 3). Then, the alternative is compared against the criteria (Table 4 – 7).

Table 3. Pairwise comparison with respect to the goal

	C1	C2	C3	C4
C1	1	1	2	1/2
C2		1	3	2
C3			1	1/2
C4				1
Inconsistency 0.06				

Table 4. Pairwise comparison in relation to criterion C1

	A	B	C
A	1	1/3	1/2
B		1	3
C			1
Inconsistency 0.05			

Table 5. Pairwise comparison in relation to criterion C2

	A	B	C
A	1	1	2
B		1	3
C			1
Inconsistency 0.02			

Table 6. Pairwise comparison in relation to criterion C3

	A	B	C
A	1	2	3
B		1	2
C			1
Inconsistency 0.01			

Table 7. Pairwise comparison in relation to criterion C4

	A	B	C
A	1	1/4	1/2
B		1	3
C			1
Inconsistency 0.02			

Sensitivity analysis – In order to determine whether changes in weighting factors affect the change in rank, a sensitivity analysis was conducted. In the table 8 minimal changes in the weighting coefficients of the criteria that lead to changes in the ranking of suppliers are shown. It can be seen that the minimum changes that lead to a change in rank are far above 0.10, so it can be said that the obtained results are relevant.

Table 8. Sensitivity analysis

Criteria	Value obtained by decision process	Minimal change	New rang
C1	0.235	0.393	C – B – A
C2	0.365	Maximum increasing or decreasing does not make a difference	/
C3	0.120	0.404	A – B – C
C4	0.281	0.351	B – C – A

Final ranking of suppliers – Finally, after the decision-making process and sensitivity analysis, the final results of the supplier ranking can be presented. In Figure 1, it can be seen that the best ranked supplier is B.

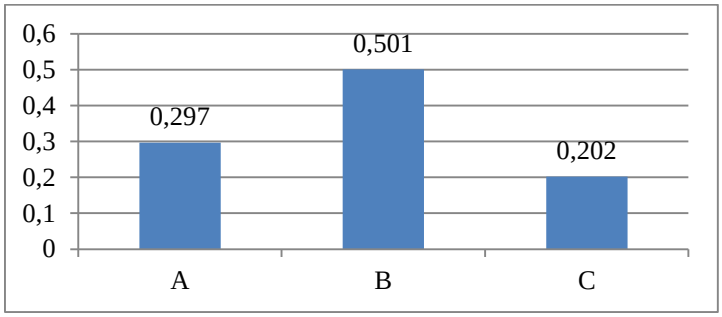


Figure 1. Final ranking of suppliers

4. CONCLUSION

In order to carry out the production process smoothly, production systems/companies need to have reliable suppliers. When choosing a supplier, company must take into account numerous criteria which mean that this selection is multicriteria problem. For that reason in this paper AHP was used. Proposed model is tested on supplier selection example. According results this model can assist to decision-makers to compare numerous suppliers according different criteria to select the best supplier.

When choosing a supplier, criteria may have qualitative descriptions, also the subjectivity of decision makers can be a problem. Therefore, it is recommended to apply AHP in a fuzzy environment in future papers.

REFERENCES

Anggani, P.C., Baihaqi, I., & Anggrahini, D. (2017). Supplier Selection Using Analytical Hierarchy Process at PT. Indolakto, Jurnal sains dan seni its, 6(1), 27 – 31.

Hruška, R., Pruša, P., & Babić, D. (2014). The use of AHP method for selection of supplier, Transport, 29(2), 195–203.

Kurttila, M., Pesonen, U.M., Kangas, J., & Kajanus, M. (2000). Utilizing the analytic hierarchy process AHP in SWOT analysis - a hybrid method and its application to a forestcertification case, Forest policy and economics, 1 (1), 41-52.

Rahmi, S.R., & Firman, F., (2019). Analysis of Supplier Selection by Using the AHP and PROMETHEE Methods in Regional Public Hospital Padang (RSUD Padang), Third

International Conference On Economics Education, Economics, Business and Management, Accounting and Entrepreneurship (PICEEBA 2019), 796-805.

Rozi, F., & Herovati, E. (2018). Supplier Selection of Technical Goods Using AHP Methods, Proceedings of the International Conference on Industrial Engineering and Operations Management Bandung, Indonesia, March 6-8.

Saaty, T.L. (1980). The Analytic Hierarchy Process: planning, priority Setting, resource allocation New York, USA: McGraw-Hill.

Saaty, T.L. (1993). The Analytic Hierarchy Process: a 1993 overview, Central European journal of operation research and economics, 2 (2), 119-137.

Shrestha, R.K., Alavalapati, J.R.R., & Kalmbacher, *RS*. (2004). Exploring the Potential for Silvopasture Adoption in South-Central Florida: An Application of SWOT-AHP Method, Agricultural Systems, 81(3), 185-199.

Stojčetović, B., Mišić, M., & Đorđević, A. (2021). Multicriteria assessment of renewable energy sources in Serbia, Tehnika, 3, 379-385.

Volume XIX, Issue (1) (2023) 385-393

International May Conference on Strategic Management

GREEN KNOWLEDGE MANAGEMENT - LITERATURE REVIEW AND OVERVIEW OF CONTEMPORARY STRUCTURAL MODELS

Aleksandra Radić*, Ivan Jovanović, Nenad Milijić

University of Belgrade, Technical Faculty in Bor, Engineering Management Department,12 Vojske Jugoslavije, 19210 Bor, Serbia

Abstract: This paper addresses the topic of green knowledge management (GKM) with reference to the literature review in this field and the review of current structural models. For this purpose, a bibliometric analysis and a systematic review were carried out. 846 papers were analysed by searching the Scopus database of scientific and academic journals. From these, only those papers that examine green management through the prism of SEM and PLS structural models were extracted in order to systematise the structural models. The result of the research is that it is a topic that has a potential growing trend in citation and publication of articles. It can also be concluded that in all structural models a positive and statistically significant influence of most GKM (Green Knowledge Management) elements on the output variables was proven.

Keywords: green knowledge management, green knowledge management elements, structural models, literature review

1. INTRODUCTION

Knowledge management (KM) is an area of business management that has been considered a critical component for achieving better business performance for decades (Idrees et al., 2023). It is defined as the process of acquiring, sharing, storaging and handling data, materials and knowledge within an organisation to increase productivity and efficiency, reduce costs and improve performance to be achieved (Mehta & Tariq, 2020). Moreover, KM can be defined as a systematic process of knowledge management consisting of three basic dimensions: organisational learning, knowledge management technologies and intellectual capital (Pacheco et al., 2022). An appropriate focus on these three dimensions leads to acquisition, internalisation, transfer, utilisation and measurement to transform implicit into explicit knowledge.

In a study conducted by Ferreira et al. (2018), 92.2% of managers believe that a KM system can influence employee learning and organisational growth, while 66.2% say it helps them work together as a team. Considering the dynamics of the business environment and new environmental challenges, the field of environmental protection has expanded to KM (Chopra et al., 2021; Wang et al., 2022).

Sustainable development is a concept that was quickly accepted in corporate practise after its emergence. With the process business internationalization and the globalisation of the

* *Corresponding author: aradic@tfbor.bg.ac.rs*

economy, the world's largest companies have realised that business based on short-term earnings does not represent a guarantee for survival in a competitive market (Hossain et al., 2022).

In order for a company to align the development of new products, services and processes with the needs of sustainability, it must have adequate knowledge, which is a critical factor in business performance (Pepple et al., 2022; Wang et al., 2022; González-Ramos et al., 2023). Only a company that relies on adequate knowledge management will be able to achieve a sustainable advantage in the market and maintain this position over time (Chaithanapat et al., 2022), while respecting environmental principles (Do Rosário Cabrita, et al., 2016; Shehzad et al., 2020).

Since the advent of sustainable development and the need to redefine many concepts, the massive greening of many aspects of management has led to the emergence of green knowledge management. Today, green knowledge management (GKM) is one of the crucial elements for the survival of organisations under conditions of increasingly intense environmental demands and pressure from stakeholders to apply the principles of sustainability.

Therefore, GKM is of great importance for any organisation that wants to survive under dynamic environmental conditions (Chopra et al., 2021; González-Ramos et al., 2023).

Since green knowledge does not exist in isolation on its own, but has implications for the sustainable competitiveness of the organisation or the environmental eligibility of the organisation, the aim of this paper is to provide an overview of current structural models that contain the GKM variable.

The first part of the paper refers to the literature review and literature analysis, while the second part of the paper presents current GKM structural models.

2. LITERATURE REVIEW

2.1. Green knowledge management - defining

In recent decades, the debate on environmental protection has led to a redefinition of many concepts and a massive greening of corporate management disciplines. The importance of environmental protection and sustainability has become an important aspect of business.

In the context of KM, it was concluded that it is of great importance to develop a comprehensive approach to understanding the process of creating, developing and applying green knowledge (Do Rosário Cabrita et al., 2016).

Thus, GKM was born, which is a new concept developed with the aim of integrating green or environmental aspects into all dimensions of traditional knowledge management (Yu et al., 2022; Shehzad et al., 2023). GKM is a proactive environmental phenomenon that is necessary for managing the companies (Abbas & Kumari, 2021). It is also a concept that can be presented as a fundamental driver of circular economy and eco-innovation (Do Rosário Cabrita, et al., 2016).

This concept consists of 5 dimensions, namely green knowledge acquisition, green knowledge storage, green knowledge sharing, green knowledge application and green knowledge creation (Yu et al., 2022), although some authors mention fewer dimensions - knowledge acquisition, knowledge sharing and knowledge application (Shehzad et al., 2020).

Knowledge acquisition means gathering new ideas by synthesising different disciplines and discovering previously undiscovered information to create new processes, products and services (Pepple et al., 2022). Looking at knowledge acquisition from the perspective of ecology and ecological performance, knowledge acquisition turns green. This knowledge refers

to the acquisition, extraction and organisation of the company's knowledge related to environmental protection (Aboelmaged & Hashem, 2019).

Knowledge storage refers to both implicti and explicit knowledge and the process of its documentation in the form of databases, manuals or archives (Pepple et al., 2022).

Green knowledge sharing is the process of transferring or sharing green knowledge with colleagues, competitors, suppliers or other interested parties who want to develop new ways, methods and techniques that can reduce the harmful effects of business activities on the natural environment (Song et al., 2020). Green knowledge sharing occurs through the process of knowledge transfer between individuals, groups or departments of the company so that the knowledge is increased (Pepple et al., 2022).

The application of green knowledge means that the accumulated and newly acquired knowledge is applied to the production of environmentally suitable products or the services providing (Yu et al., 2022).

Green knowledge creation is the formation or acquisition of new knowledge, ideas or thoughts that explicitly relate to the environment.

2.2. Green knowledge management – literature analyse

Green knowledge management is attracting the attention of researchers and academics, and it is not surprising that the number of published papers dealing with green knowledge management shows an increasing trend. Data from the Scopus database, shows that the number of published papers on this topic of green knowledge management is on an upward trend (Figure 1).

The data refers to the period 2014-2023 and to the scientific fields of Ecological Sustainability, Engineering and Business, Management & Accounting. Figure 1 was created based on the keywords Sustainable Development, Sustainability and Knowledge Management on 21 March 2023.

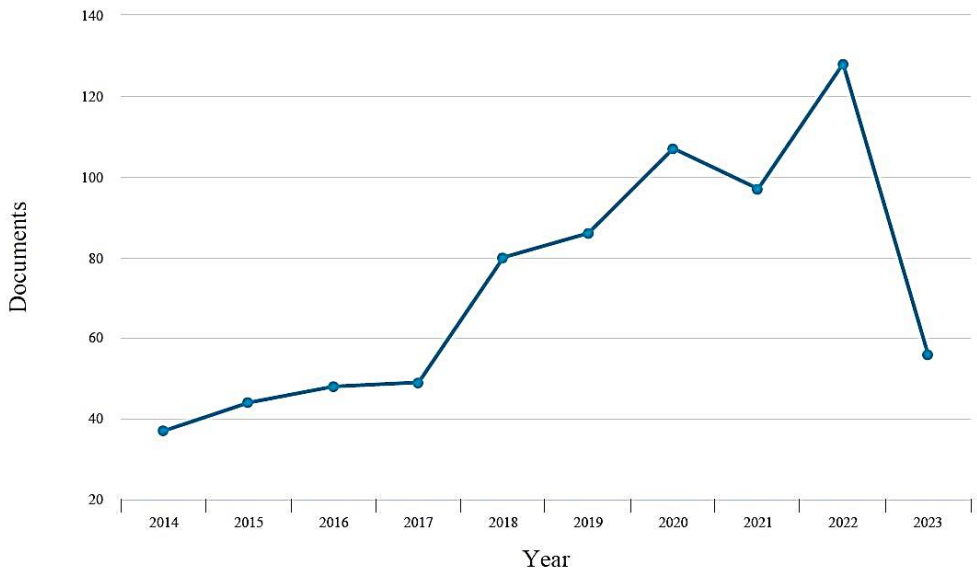


Figure 1. Green management knowledge documents from 2014 to 2023 (Scopus, 21st April 2023)

Based on Figure 1, it can be seen that 2017 is a turning point in the growth of the number of papers on this topic, after which there is a sharp increase. Furthermore, the number of papers

in April 2023 is similar to the number at the end of 2015, which speaks to the actuality of the GKM topic.

Figure 2 shows the percentage of papers by subject area. From this it can be concluded that the largest number of papers are from the three scientific fields mentioned above and with the majority of papers from the field of Environmental Science.

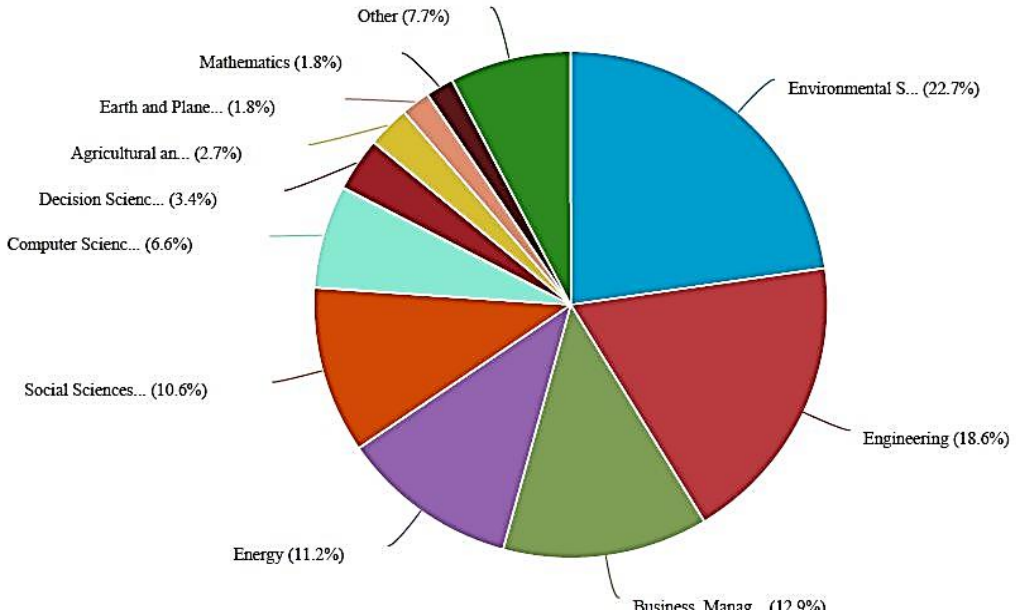


Figure 2. Green management knowledge documents by subject area (Scopus, 21st April 2023)

More than 19% of the total number of papers are in the subject area of Environmental Science, slightly more than 17% are in the subject area of Engineering and 11.9% of the papers are in the subject area of Business Management & Accounting. This indicates the topicality of the subject and justifies further research on a similar topic.

3. METHODOLOGY

Bibliometrics is the application of mathematical and statistical methods to books and other means of communication (Pritchard, 1969). In this paper, bibliometric analysis has been used as one of the best indicators of scientific productivity. It is an important and globally accepted method for evaluating science.

Bibliometric analysis is a method for the quantitative study of bibliographic records of human creativity. This method involves the application of quantitative analysis and statistics to publications such as journals and their associated citations. The basic bibliometric measure is the count of publications published in international journals.

In this particular case, by analysing the number of publications, a conclusion can be drawn about the contribution of GKM to science for the analysed period from 2014 to 2023. The bibliometric indicator was used for the analysis, i.e. the total number of papers in the observed period.

The representation of the research process can be seen in Figure 3. Based on the given criteria shown in Figure 3, 846 works were selected from the Scopus database, of which only those works containing structural models of green knowledge management were analysed. For the analysis of the works, data mining was also used as a technique to sort the works in

order to find suitable models in a large database. Data mining helps to identify what is relevant and later use this data as output. This work also relies on a qualitative analysis of the content of the papers.

Figure 3. Research process

In this context, certain research results were obtained by means of bibliometric analysis, data mining and qualitative analysis.

4. RESULTS AND DISCUSSION

Based on the literature review, Table 1 shows the current GKM structural models that were published in the period from 2020 to 2023.

In some papers (Song et al., 2020; Aamir et al., 2021; Sahoo et al., 2022; Malik et al., 2023), the structural models refer only to specific elements of GKM, while other papers take a comprehensive approach and examine all elements of GKM (Shehzad et al., 2020; Hossain et al., 2022).

Moreover, some papers consider GKM or one of its elements as an independent variable (Song et al., 2020; Shehzad et al., 2020; Aamir et al., 2021; Sahoo et al., 2022; Malik et al., 2023; Wang et al., 2023), while others present GKM as a mediator variable. The mediator effect is the association of one variable with another in such a way that this correlation is determined by a third variable, while the moderator effect is actually an interaction effect.

A greater number of papers use SEM modelling, while certain research moves towards a combination of SEM-PLS models. The context in which the research is conducted is still territorially limited to a specific national level. Some industries or several different industries are studied. Moreover, all the mentioned models were created for specific industries that are not territorially limited to the territory of the Republic of Serbia.

Table 1. Review of GKM structural models

Authors and year of publication	Context	Model type	Dependent variables	Independent variables	Mediators	Moderators	Results
Song et al., 2020	Chinese manufacturing firms	SEM	Green innovation (GI)	Green knowledge sharing (GKS)	Absorptive capacity	Stakeholder pressures	GKS has significant impact on GI
Shehzad et al., 2020	52 organizations' sample of different industries	SEM-PLS	Corporate sustainable performance (CRS)	Knowledge management process (KMP)	Green innovation (GI)	Organization's agility	KMP has significant positive impact on GI and GI have significant positive impact on CSR
Aamir et al., 2021	295 respondents from different organizations	SEM-PLS	Sustainable Performance (SP)	Green knowledge sharing (GKS)	Employee Ambidexterity (EA)	NA	GKS has significant impact on SP due to the mediating impact of EA
Hossain et al., 2022	Bangladesh's textile garment industry	SEM	Corporate sustainability (CS)	Corporate culture, Transformational corporate leadership, Corporate structure and Social capital	Knowledge management (KM)	NA	All four independent variables have significant impact on CS through KM
Sahoo et al., 2022	Indian manufacturing sector	PLS	Corporate environmental performance (CEP)	Green knowledge acquisition (GKA)	Green technology innovations (GTI)	Resource commitment	GKM has a direct impact on CEP and a considerable indirect effect through GTI
Wang et al., 2022	Services and manufacturing firms in Turkey	SEM	Corporate sustainable development (CSD)	Green knowledge management (GKM)	Green innovation (GI)	Organization green culture (OGC)	GKM has positive significant impact on CSD
Malik et al., 2023	Pakistan firms	SEM	Sustainable competitive advantage (SCA)	Green project management practices (GPMP)	Green knowledge acquisition (GKA)	NA	GPMP has direct and indirect positive impact on SCA through GKA

Figure 4 and Figure 5 show some of the mentioned structural models for illustration.

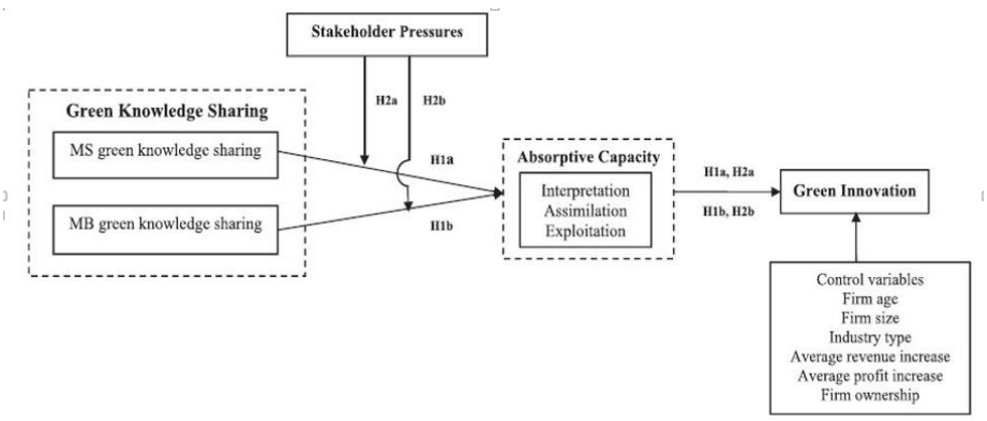


Figure 4. Structural model (Song et al., 2019)

Figure 4 shows the structural model proposed by Song et al. (2019), which shows the impact of green knowledge sharing on green innovation. This structural model proved that GKS has significant and positive impact on green innovation. The model has both moderator and mediator variable.

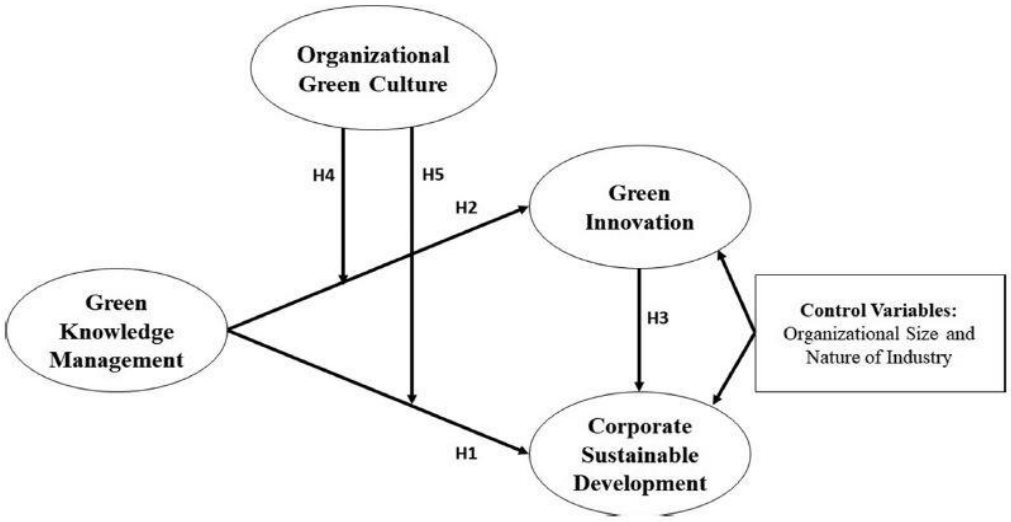


Figure 5. Structural model (Wang et al., 2022)

Figure 5 shows the structural model proposed by Wang et al. (2022). The structural model examines the impact of GKM on green innovation and corporate sustainable development.

5. CONCLUSION

Green knowledge management is extremely important to achieve the widely aspired performance of a sustainable enterprise, the principles of environmental protection and circular economy.

The aim of this paper was to provide a cross-section of the current relevant literature on green knowledge and the process of managing this concept, with special reference to the structural models. For this purpose, a bibliometric analysis was carried out based on certain predefined criteria and the research results were presented in a systematized way. GKM is an area of research with a potentially growing trend in citation and publication of papers, and it is expected that this topic will become even more prominent in the coming years to come.

This paper also discusses structural models that include the GKM concept as one of the variables (dependent, independent or mediator variable). Some structural models represent the GKM process comprehensively with all elements, while certain models only examine the influence of one of the GKM elements.

From the results of previous research, it can be concluded that in all structural models a positive and statistically significant influence of all or individual GKM elements could be demonstrated.

In the future period, more papers are expected that will prove similar hypotheses, because the review of the literature showed that in 2022 and 2023 there are research results that are at the level of questionnaire verification as a foundation for the future development of SEM and PLS models.

This work has certain limitations. First, the analysed results refer to the Scopus database. Second, the review of structural models is not complete, as more works are expected to be published in the future. The third review of structural models is focused on recent research.

The practical implications of this work include a systematized approach and insight into the current state of the narrow scientific field of green knowledge management. The structural models presented in this paper along with the relevant literature provide a good basis for research in other environments, countries in transition economies or countries that are candidates for EU membership. Also, considering that all the papers are based on research outside the territory of the Republic of Serbia, this work represents the starting point for further research on this topic in the national framework.

ACKNOWLEDGEMENTS

The research presented in this paper was done with the financial support of the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, within the funding of the scientific research work at the University of Belgrade, Technical Faculty in Bor, according to the contract with registration number 451-03-47/2023-01/ 200131

REFERENCES

Aamir, A., Jan, S. U., Qadus, A., Nassani, A. A., & Haffar, M. (2021). Impact of knowledge sharing on sustainable performance: mediating role of employee's ambidexterity. Sustainability, 13(22), 12788.

Abbas, J., & Kumari, K. (2021). Examining the relationship between total quality management and knowledge management and their impact on organizational performance: a dimensional analysis. Journal of Economic and Administrative Sciences (In press).

Aboelmaged, M., & Hashem, G. (2019). Absorptive capacity and green innovation adoption in SMEs: The mediating effects of sustainable organisational capabilities. Journal of cleaner production, 220, 853-863.

Chaithanapat, P., Punnakitikashem, P., Oo, N. C. K. K., & Rakthin, S. (2022). Relationships among knowledge-oriented leadership, customer knowledge management, innovation quality and firm performance in SMEs. Journal of Innovation & Knowledge, 7 (1), 100162.

Chopra, M., Saini, N., Kumar, S., Varma, A., Mangla, S. K., & Lim, W. M. (2021). Past, present, and future of knowledge management for business sustainability. Journal of Cleaner Production, 328, 129592.

Do Rosário Cabrita, M., Cruz-Machado, V., Matos, F., & Safari, H. (2016). Green knowledge: developing a framework that integrates knowledge management and eco-innovation. In European Conference on Knowledge Management (p. 127). Academic Conferences International Limited.

Ferreira, J., Mueller, J., & Papa, A. (2018). Strategic knowledge management: Theory, practice and future challenges. Journal of knowledge management, 24(2), 121–126.

González-Ramos, M. I., Guadamillas, F., & Donate, M. J. (2023). The relationship between knowledge management strategies and corporate social responsibility: Effects on innovation capabilities. Technological Forecasting and Social Change, 188, 122287.

Hossain, M. B., Nassar, S., Rahman, M. U., Dunay, A., & Illés, C. B. (2022). Exploring the mediating role of knowledge management practices to corporate sustainability. Journal of Cleaner Production, 374, 133869.

Idrees, H., Xu, J., Haider, S. A., & Tehseen, S. (2023). A systematic review of knowledge management and new product development projects: Trends, issues, and challenges. Journal of Innovation & Knowledge, 8 (2), 100350.

Malik, M., Ali, M., Latan, H., & Chiappetta Jabbour, C. J. (2023). Green project management practices, green knowledge acquisition and sustainable competitive advantage: Empirical evidence. Journal of Knowledge Management.

Mehta, A. M., & Tariq, M. (2020). An Institution Based View Towards Innovation Strategy and Knowledge Management in the European Region. Journal of Management Information and Decision Sciences, 23 (4), 223–228.

Pacheco, G. V., Castillo, A. E., Manotas, E. N., Archibol, W., & Juvinao, B. R. (2022). Structural dimensions of knowledge management: factorial analysis in exporting industrial SMEs. Procedia Computer Science, 203, 491-495.

Pepple, D., Makama, C., & Okeke, J. P. (2022). Knowledge management practices: A public sector perspective. Journal of Business Research, 153, 509-516.

Pritchard, A, Statistical Bibliography or Bibliometrics?, Journal of Documentation, 25(4) Dec 1969, 348–349.

Sahoo, S., Kumar, A., & Upadhyay, A. (2023). How do green knowledge management and green technology innovation impact corporate environmental performance? Understanding the role of green knowledge acquisition. Business Strategy and the Environment, 32(1), 551-569.

Scopus. Available at https://www.scopus.com. Accessed in April, 2023.

Shehzad, M., Qu, Y., Zafar, A. U., Rehman, S. U., & Islam, T. (2020). Exploring the influence of knowledge management process on corporate sustainable performance through green innovation. Journal of Knowledge Management, 24(9), 2079-2106.

Shehzad, M. U., Zhang, J., Latif, K. F., Jamil, K., & Waseel, A. H. (2023). Do green entrepreneurial orientation and green knowledge management matter in the pursuit of ambidextrous green innovation: A moderated mediation model. Journal of Cleaner Production, 388, 135971.

Song, M., Yang, M. X., Zeng, K. J., & Feng, W. (2020). Green knowledge sharing, stakeholder pressure, absorptive capacity, and green innovation: Evidence from Chinese manufacturing firms. Business Strategy and the Environment, 29(3), 1517-1531.

Wang, S., Abbas, J., Sial, M. S., Álvarez-Otero, S., & Cioca, L. I. (2022). Achieving green innovation and sustainable development goals through green knowledge management: Moderating role of organizational green culture. Journal of Innovation & Knowledge, 7 (4), 100272.

Yu, S., Abbas, J., Alvarez-Otero, S., & Cherian, J. (2022). Green knowledge management: Scale development and validation. Journal of Innovation & Knowledge, 7(4), 100244.

Volume XIX, Issue (1) (2023) 394-402

International May Conference on Strategic Management

ANALYSIS SWOT ON BLUE AMMONIA PRODUCTION AS AN ALTERNATIVE TO REDUCE CO_2 EMISSIONS IN ECUADOR

Bautista Hugo[1,2*], Argotti Eduardo[2], Haro Andrés[3], Rojas Allan[1]

[1]Kazan Federal University, Russia; [2]Armed Forces University ESPE, Ecuador; [3]University of Cuenca, Ecuador

Abstract: The global energy trend aims to replace traditional hydrocarbons with unconventional fuels such as hydrogen. The latter has been the subject of research in developed countries in recent decades, due to its enormous energy content and little or no environmental pollution. However, its production cost is still not competitive enough in relation to fossil fuels. The production of ammonium can be carried out on the basis of hydrogen. The aforementioned is obtained by methods such as: catalytic decomposition of hydrocarbons, pyrolysis, gasification from biomass, ethanol processing, the anhydrous transformation of methanol, and photoelectrochemical and photocatalytic reactions of water. Liquefied petroleum gas and associated petroleum gas are raw materials for ammonia generation. Several member countries of OPEC are working to facilitate the gradual transition from oil to fuels little or nothing known. In this article we summarize several strategies to carry out this transition, putting for your consideration the pros and cons of implementing a system for the use of liquefied petroleum gas and associated petroleum gas that is currently burned in oil field burners. The authors affirm that there is great potential for the production of ammonium in the area of Bajo Alto province of El Oro, as an alternative energy resource in Ecuador. The global energy trend aims to replace traditional hydrocarbons with non-conventional fuels such as hydrogen. However, its production cost is still not competitive enough in relation to fossil.

Keywords: Alternative energies, natural gas, blue hydrogen production, ecology, fossil fuel residues in the environment.

1. INTRODUCTION

The actual environmental status in the world before the global warm up due to the increment of green-house gases (GHG) effect has given place to monitoring and quantification on the local and global impact, technical and political debates, research on technological approaches and new solutions to cope with the problem, re-utilization/storage of pollution compounds for energy generation or minimization of their effect in the atmosphere, etc. Several countries have signed an agreement called the Paris Agreement, as a compromise to contribute mitigating and minimizing the production and release of GHG into the atmosphere. This agreement was first signed in 2016. The goal of the Paris agreement is to limit the mean global temperature rise produced by the emissions of GHG into the atmosphere, to below 2 °C.

Among the top two countries in 2021, regarding air pollution with CO_2 emissions are China and U.S.A. (Global Energy Review, 2021; Oxford U., 2022). As well-known the GHG

* *Corresponding author: hbautista@mail.ru*

are CO_2, CH_4 and N_2O. The climate watch data reported that the global greatest share (73.2%) of GHG emissions are produced as a result of the energy generation process, where 24.2% is for industries, 17.5% in buildings and 16.2% for transport. Thanks to the exothermic reaction of a combustion process of organic matter, these gases are released in the form of CO_2. The fuel to energy generation correspond to a fossil source as coal in the first place, followed by crude oil and natural gas (Global Energy Review, 2022). Basing on data published by Poore and Nemecek, 2018, a data base project called the Our World in Data organized by the Oxford University reported that around 26% of GHG refer to methane which is released from the food industry (Oxford U., 2022).

During production and depletion of oil reservoirs, methane and other light oil fractions (APG) are released on the surface of oil fields. However, as usual practice this gas is avoided to be released into the atmosphere and therefore, is burned in a process called gas flaring on the top of oil wells. The School of mines and the association for Global Gas Flaring Reduction (GGFR) together with the National Oceanic and Atmospheric Administration (NOAA) of the United States since 2012 count with a system for estimation of the quantity of Associated Petroleum Gas (APG) in the world. This is based on quantification of infrared satellite images (Figure 1) (UN &The Paris agreement, 2015). The World Bank claims that in 2020, the world's gas flaring volume was about 142 billion m3, coming from APG and Liquefied Natural Gas (LPG). In 2020 Ecuador took the 25th position among the biggest COx emitters in the world with a total of 1.04 billion m3 of gas (GGFR, 2022).

The goal of this paper is to analyse the potential alternatives to leverage wasted hydrocarbon resources for conversion into a utilized end-fuel instead of flaring it and subsequently, the no meaningless reduction of CO2 emissions into the atmosphere.

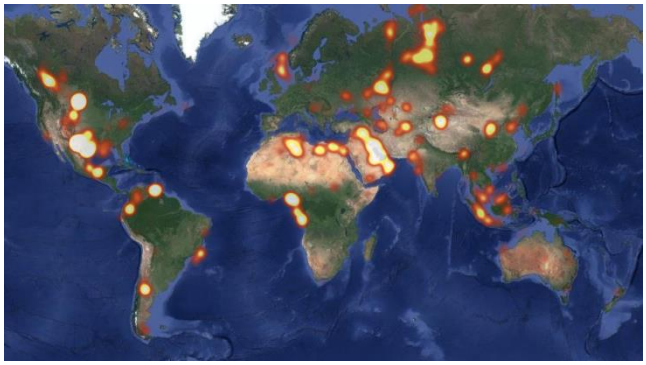


Figure 1. APG flaring activity sites worldwide (The Paris Agreement UN, 2015)

2. MATERIALS AND METHODOLOGY

The SWOT analysis is a strategic planification technique used for the evaluation of the position of a certain process. In this article, the authors will emphasize the recycling and APG utilization for the ammonia production. The analysis consists of four key elements: strengths, weaknesses, opportunities and threads (Li et al., 2022). This is a general analysis, so that, it should be used as part of a broader strategy along with traceable parameters and measures of the results to allow for and improvement of the system.

2.1. Strengths

Among the current Ecuador's and world's challenges are the transition from fossil fuels to renewable or environmentally safe fuels and the mitigation of world's temperature increment due to GHG effects. The energy transition process is not fast nor easy, instead itis slow and technically complex and expensive. The energy transition debates, as well-known started because of the decline in the world's oil production rates as a consequence of the steady depletion of conventional oil reserves. This has traced concern in the way we obtain energy and on what will be the energy source in the near future when fossil fuels will be exhausted. For these reasons it is not meaningless to provide analysis that foster proposals for further actions on minimizing energy waste and maximizing efficient energy consumption.

The term "carbon neutral" used in available literature, refers to the energy source that do not generate GHG emissions to the atmosphere (European Parliament, 2019). Among the most popular fuels available in the market nowadays are presented in Figure 2. From the shown fuels in Figure 2, two of them while combusting, do not generate COx emissions. These are hydrogen (H_2) and ammonia (NH_3). The energy density difference between them is remarkable, being H_2 the most energy releasing fuel. However, NH_3 is a competitive fuel since its energy density is quite close to that of methanol.

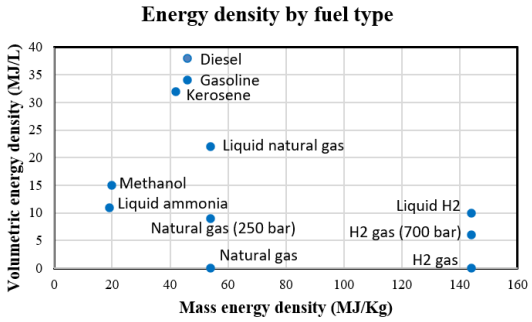


Figure 2. Energy density of most popular fuels (Duynslaegher et al., 2017)

The use of H_2 for the energy generation poses a challenge of its high production cost and complexity during its treatment storage and transport. While processing H_2, the phase change from gas to liquid (liquefaction) requires substantially low operational temperatures. It is liquefied at the temperature of -253°C. Nowadays there is a steadily increasing interest for the use of NH_3 as an alternative energy source in comparison to H_2. The advantage of the NH_3 processing before H_2 is that its processing is less complex and cheaper. Another fact that makes NH_3 attractive is its higher liquefaction temperature which means less energy is necessary to drop down the fuel temperature to a certain point. The NH_3 liquefaction temperature is at -33°C.

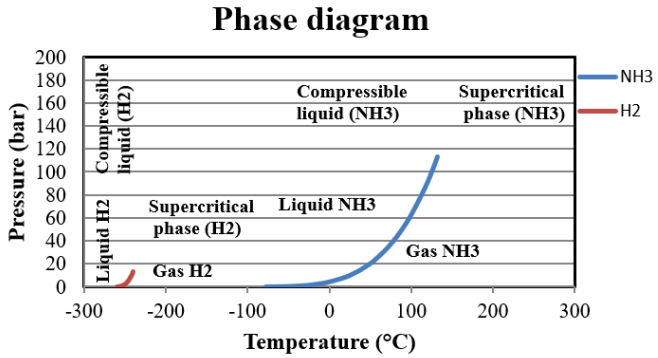


Figure 3. Phase diagram of NH_3 and H_2 (Ammonia, 2018)

The molecular composition of NH_3 lacks chemical elements as carbon or sulphur. For this reason, after that NH_3 is in contact with an O_2 molecule and reaches the activation energy for the combustion reaction (1) it produces zero COx or SOx emissions, alike the hydrocarbon combustion that does generate COx emissions (Rojas et al., 2021; Lyon, 1976) since they contain carbon molecules. Kinetic studies on NH_3 oxidation have reported that the nitrogen oxides (NOx) as the nitrogen monoxide (NO), nitrogen dioxide (NO_2), nitrous oxide (N_2O) and other products that can be generated (2 – 13) during the oxidation reactions of NH3. Due to the high reaction temperatures, two types of NOx can be formed: thermal or also know in the literature as the Zeldovich mechanism (2 – 4) and combusting (5 – 13) (Klippenstein et al., 2011, Kobayashi et al., 2019).

From the environmental point of view, NO and NO_2 are producers of acid rain, meanwhile the N_2O is a GHG. The NO thermal reactions are favoured at temperatures higher than 1500 °C. However, (2) is limited by the reaction rate. For this reason, by regulating the operational temperature, the NO thermal production can be controlled (Glaborg et al., 2018; Li et al, 2021). Consequently, the oxidation of NO (2 – 9) takes to the NO_2 formation. The reaction types as (10) and (11), have been reported as important, due to the fact that are the governing reactions under all NO reduction reaction conditions. Additionally, Lyon R., 1976 mentioned that under certain temperature and O_2 saturation in air conditions, the NH_3 reduction could improve by using a process called DeNOx. Finally, N_2O produced via (12) is consumed via (13).

$$4NH_3 + 3O_2 \Rightarrow 2N_2 + 6H_2O \quad (1)$$
$$N_2 + O \leftrightarrow NO + N \quad (2)$$
$$N + O_2 \leftrightarrow NO + O \quad (3)$$
$$N + OH \leftrightarrow NO + H \quad (4)$$
$$NH_3 + O \leftrightarrow NH_2 + OH \quad (5)$$
$$NH_2 + O_2 \leftrightarrow H_2NO + O \quad (6)$$
$$NH_2 + O_2 \leftrightarrow HNO + OH \quad (7)$$
$$NH + O_2 \leftrightarrow HNO + O \quad (8)$$
$$NH + O_2 \leftrightarrow NO + OH \quad (9)$$
$$NH_2 + NO \leftrightarrow NNH + OH \quad (10)$$
$$NH_2 + NO \leftrightarrow N_2 + H_2O \quad (11)$$
$$NH_2 + NO_2 \leftrightarrow N_2O + H_2O \quad (12)$$
$$N_2O + H \rightarrow N_2 + OH \quad (13)$$

The amount of energy produced from the NH3 full combustion reaction is slightly lower than that of natural gas, gasoline or diesel (Figure 2). It has the potential to be used as a powerful energy source. Also, in order to increase even more the NH_3 power supply during combustion reactions, attempts have been done by mixing other gases and create a hybrid combustion with H_2 and CH_4.

The APG conversion for the NH_3 production demands the use of energy during its treatment. In most of the cases, this energy comes from fossil sources. However, nowadays with the rising of systems that allow to obtain renewable energy (i.e. solar, hydraulic, wind, etc) this can be counter backed. By applying this approach, the NH_3 could finish its cycle by being a neutral carbon fuel from is processing to consumption. The NH_3 production is an exploited industry in several countries of the world. In the Figure 3 is shown the NH_3 production by country, where it is observed that China, Russia, India and U.S.A., are the top worldwide producers.

2.2. Weaknesses

The NH_3 production as a fuel for its integration into the country's energy matrix requires the use of hydrocarbons as a feed. Regardless the carbon neutrality of NH_3, it still is dependent on its source before processing which requires the exploitation of oil fields. Another fact is that despite NH_3 does not produce GHG, at the end of all it is a non-renewable energy source, and its availability might be linked to available hydrocarbon resources and conversion rates. Moreover, one of the main problems to leverage energies and their effective incorporation into the energy matrix of each country is related to political and financial discussions. Usually, energy projects demand great investment on infrastructure of diverse types related to the commodity's transport, treatment and storage before it is handed out to the end customer. Also, other factors such as: land ownership and socio-environmental agreements, current hydrocarbon prices, demand and consumption, availability of hydrocarbon resources, availability of import terminals in the case of absence of resources, etc. Finally, changes in legislation are necessary to foster and support research and development (R&D) in the country.

2.3. Opportunities

APG is a mixture of light hydrocarbon gases and in most of the cases it surpasses the 80% content of methane, and 20% of ethane to pentane and other non-hydrocarbon gases. Under the assumption that APG is made of 100% methane, then, the mass balance equation for full combustion of APG is presented in (14). By simple balance of the molecularity of each component, it indicates that each $kgCH_4$ produces 2.75 $kgCO_2$ and that 1 $m3CH_4$ produces 1$m3CO_2$ (densityCH_4, SC 0,648 kg/m3 and density CO_2, SC 1,784 kg/m3) after combustion.

$CH_4 + 2O_2 => CO_2 + 2H_2O$

Within the strategies to counter back the carbon emissions into the atmosphere we bring up the idea of instead of flaring gas on top of oil fields in the Ecuadorian Amazon, using APG for conversion into a carbon-neutral fuel as ammonia to optimize the use of available energy resources from fossil fuels in the country and in this way, reaffirm the Paris Agreement (The Paris Agreement, 2015). The estimated volumes of flared APG in 2020 in the Ecuadorian amazon are presented in Figure 4. It is shown that approximately 1 trillion m3 of APG were flared at the top of oil wells in oil fields. This indicates that by not flaring APG and instead implementing a method of leveraging these hydrocarbon resources, approximately 1 trillion m3 CO_2 would not be released into the atmosphere every year.

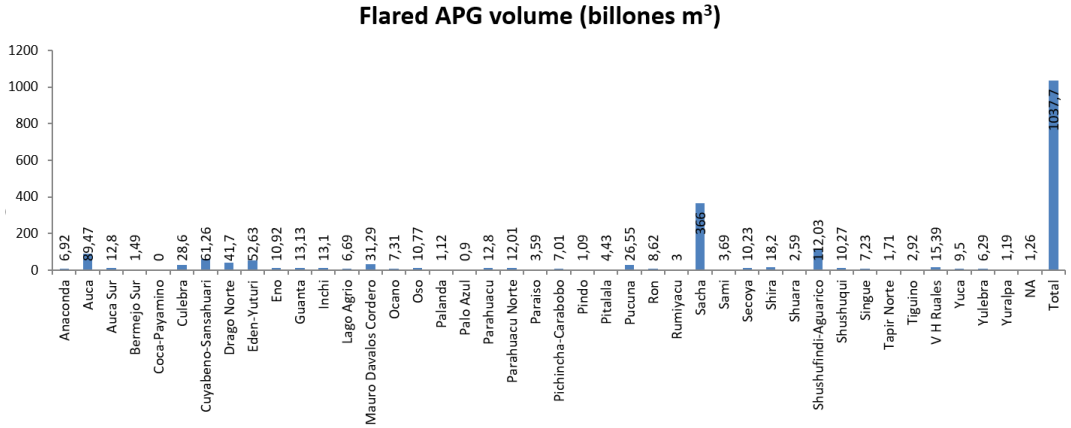


Figure. 4 Annual flared APG volume in Ecuadorian oil fields in 2020 (Global Gas Flaring Data, 2020; Global Gas Flaring Data, 2021)

Here we are summarizing three existing methods for the obtention of NH3 (Glarborg et al, 2018; Varfolomeev et al, 2021):

- The grey NH_3 is produced from natural gas. It requires the addition of CO_2 to the feed. To produce 1 Ton of grey NH_3 it is required the addition of 2 tons of CO_2.
- Blue NH_3, in its production all the gases must be recycled.
- Green NH_3, the key difference is that the energy used in its production must be generated from renewable energy sources such as solar, wind, tidal, geothermal, and other non-traditional power plants with little performance.

In most techniques, the capture of COx is considered since production is related to both combustion and burning and polluting emissions to the environment. In Ecuador, CO_2 is not captured or stored.

Through COx capture technology, it is possible to predict the amount of CO_2 captured and therefore apply it to economic benefits at an international level.

In the case of NH_3 production, there are no residual emissions, 100% goes as blue NH_3 after the process (Table 1).

Companies like MAN are committed to using ammonia as a future fuel.

VLSFO and Ammonium energy cost2030 (US Geological survey, 2020):

- 12.5 to 15 dollars/GJ (Gigajoule) for VLSFO (2020);
- $13.5/GJ for conventional ammonium today (stable as of 2018);
- US$13.5 to US$15/GJ, the projected cost of green ammonium from solar and wind power between 2040 and 2050;
- 16 to 21.5 dollars/GJ for carbon ammonium as fuel in 2025.

To keep it in the liquid phase (Ammonia, 2018; Amin et al., 2013; European Parliament, 2019) as the ambient temperature increases, they normally design NH_3 tanks without hypothermia for 18 bar pressure.

For the future energy source, without CO_2 residues, to be attractive, the price of fuel, including all costs, should be competitive with the price of traditional fuel. If this is achieved by CO2/GL regulation, the period for conversion of the engine to the future fuel can be as short as the regulations come into force.

Liquid NH_3 can be stored at a pressure greater than 8.6 bar at a temperature of 20ºC.

2.4. Threats

Following threats are identified:

- New technology in Ecuador, there are no feasibility studies therefore its effectiveness is not guaranteed;
- Radical environmentalists (social groups) are opposed to the use of fossil fuels.

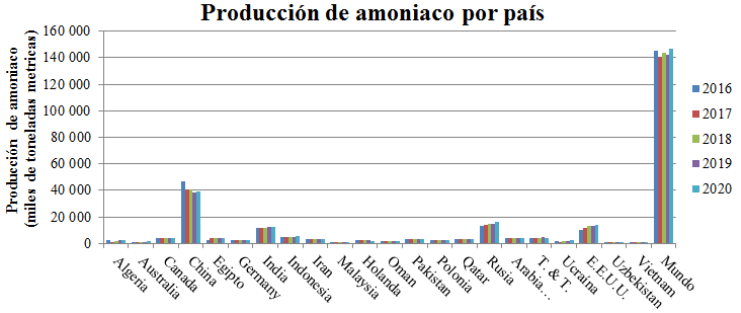


Figure 5. Annual flared APG volume in Ecuadorian oil fields in 2020 (Bautista et al., 2023).

3. RESULTS AND DISCUSSION

This study analyses the ammonia industry, in order to know the state of the art of this compound and its characteristics, describing the main methods of production, importing and exporting countries, the technologies used for its transport and storage, as well as the security measures for its handling and the regulations and standards applicable to the different elements of its value chain. In addition, it analyses the opportunities and considerations to take into account for the use of ammonia as a carrier of green hydrogen or as fuel, either through internal combustion engines, turbines, boilers or fuel cells (Table 1).

Table 1. Analysis SWOT on Blue ammonia production as an alternative to reduce CO_2 Emissions in Ecuador

STRENGTHS	**OPPORTUNITIES**
-Fuel with high energy content -Its complete combustion does not generate polluting waste to the environment -Reduce carbon footprint -Strengthens the commitment of the Paris agreement -Contributes to the global energy transition (transition from fossil resources to hydrogen)	-Tax benefits -Unconventional source of energy -Extraction of methane gas in unconventional deposits -Exploitation of unused energy resources -Development and application of CCUS in Ecuador (Carbon capture and storage) -Carbon Bonds -Reduces gas flaring in oil fields
WEAKNESSES	**THREADS**
-Non-renewable energy source -Lack of infrastructure for transportation and storage -Environmental impact by extracting the methane and capturing carbon -Lack of incentives and legislative policies by the government for innovation and optimization of unused natural resources	-New technology in Ecuador, there are no feasibility studies therefore its effectiveness is not guaranteed -Radical environmentalists (social groups) are opposed to the use of fossil fuels.

4. CONCLUSION

In Ecuador, are no previous economic studies of the impact generated by burning associated gas from the point of view of energy/unused mass (opportunity cost).The green hydrogen that could be produced in Ecuador, being the flared APG one of the main sources. If the data shown in the tables of this publication is taken as a reference, 7.8 [Mton] of ammonia could be produced annually. Which is equivalent to 42.3% of the ammonium marketed worldwide in the year 2020.

It is necessary to implement some type of Ecuadorian regulation of CO_2 emissions. According to our analysis, it is possible to monetize the lighter gases. In this way we will be able to limit and reduce COx emissions into the atmosphere, parallel to this, the study and implementation of technologies that use greenhouse gases in Ecuador will be favored. Companies that emit enormous amounts of gases into the air will have to submit reports on this.

The physical and chemical properties of blue ammonium are important and involve field studies to define the system design, including storage.

Finally, we can affirm that there is a real opportunity to lower the carbon footprint and generate energy using the lighter gases that pollute the atmosphere both in Bajo Alto and in the rest of Ecuador.

ACKNOWLEDGMENT

The authors would like to thank SENESCYT (Convocatoria abierta 2013) for the project's formalization and support.

REFERENCES

Duynslaegher, C., Jeanmart, H., & Vandooren, J. (2009). Flame structure studies of premixed ammonia/hydrogen/oxygen/argon flames: Experimental and numerical investigation. Proceedings of the Combustion Institute, 32(1), 1277–1284.

Engineering ToolBox, (2018). Ammonia - Properties at Gas-Liquid Equilibrium Conditions. (online). Retrieved from: https://www.engineeringtoolbox.com/ammonia-gas-liquid-equilibrium-condition-properties-temperature-pressure-boiling-curve-d_2013.html (Accessed on April 24, 2023).

European Parliament News. (2019). What Is Carbon Neutrality and How Can It Be Achieved by 2050?. *Society*. Retrieved from: https://www.europarl.europa.eu/news/en/headlines/society/20190926STO62270/what-is-carbon-neutrality-and-how-can-it-be-achieved-by-2050 (Accessed on April 24, 2023).

Glarborg, P., Miller, J. H., Ruscic, B., & Klippenstein, S. J. (2018). Modeling nitrogen chemistry in combustion. Progress in Energy and Combustion Science, 67, 31–68. Retrieved from: https://doi.org/10.1016/j.pecs.2018.01.002 (Accessed on March 23, 2022).

IEA. (2021). Global Energy Review: CO2 Emissions in 2020–Analysis. https://www.iea.org/reports/global-energy-review-co2-emissions-in-2021-2

Klippenstein, S. J., Harding, L. B., Glarborg, P., & Miller, J. H. (2011). The role of NNH in NO formation and control. Combustion and Flame, 158(4), 774–789.

Kobayashi, H., Hayakawa, A., Somarathne, K. K. A., & Okafor, E. C. (2019). Science and technology of ammonia combustion. Proceedings of the Combustion Institute, 37(1), 109–133.

Li, J., Lai, S., Chen, D., Wu, R., Kobayashi, N., Deng, L., & Huang, H. (2021). A review on combustion characteristics of ammonia as a carbon-free fuel. Frontiers in Energy Research, 9, 760356.

Lyon, R. K. (1976). The nh3-no-o2 reaction. International Journal of Chemical Kinetics, 8(2), 315-318.

Mashruk, S., Kovaleva, M., Tung Chong, C., Hayakawa, A., Okafor, E. C., & Valera-Medina, A. (2021). Nitrogen Oxides as a by-product of Ammonia/Hydrogen combustion regimes. Chemical Engineering Transactions 89, 613-618.

Miller, J. A., & Bowman, C. T. (1989). Mechanism and modeling of nitrogen chemistry in combustion. Progress in energy and combustion science, 15(4), 287-338.

Miller, J. A., & Melius, C. F. (1992, January). The reactions of imidogen with nitric oxide and molecular oxygen. In Symposium (International) on Combustion (Vol. 24, No. 1, pp. 719-726). Elsevier.

Oxford University. (2020). Our world in Data. Emissions by sector - Our World in Data. Retrieved from: https://ourworldindata.org/emissions-by-sector (Accessed on April 20, 2023).

Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. Science, 360(6392), 987-992.

Rojas, A.A., Yuan, C., Emelianov, D.A., Saifullin, E.R., Mehrabi-Kalajahi, S., Varfolomeev, M.A., Sudakov, V.A., Lotfullin, B.R., Shevchenko, D. V., Ganiev, B.G., Lutfullin, A.A., & Zaripov, A.T. (2021). A 3-Step Reaction Model for Numerical Simulation of In-Situ Combustion. SPE Russian Petroleum Technology Conference, October 2021. Retrieved from: doi: https://doi.org/10.2118/206430-MS (Accessed on March 23, 2022).

Song, S., Hanson, R. K., Bowman, C. T., & Golden, D. M. (2001). Shock tube determination of the overall rate of NH2+ NO→ products in the thermal De-NOx temperature window. International Journal of Chemical Kinetics, 33(11), 715-721.

Sutherland, J. W., Patterson, P. M., & Klemm, R. B. (1990). Flash photolysis-shock tube kinetic investigation of the reaction of oxygen (3P) atoms with ammonia. Journal of Physical Chemistry, 94(6), 2471-2475. Global Gas Flaring Data. (2020). World Bank. https://www.ggfrdata.org/

Global Gas Flaring Data. (2021). World Bank. Retrieved from: https://www.worldbank.org/en/topic/extractiveindustries/publication/global-gas-flaring-tracker-report(Accessed on March 23, 2022).

United Nations, The Paris Agreement (2015), Retrieved from: https://unfccc.int/sites/default/files/english_paris_agreement.pdf (Accessed on March 23, 2022).

Nitrogen Statistics and Information | U.S. Geological Survey. (2020). Retrieved from: https://www.usgs.gov/centers/national-minerals-information-center/nitrogen-statistics-and-information (Accessed on March 23, 2022).

Varfolomeev, M. A., Bolotov, A., Minkhanov, I. F., Mehrabi-Kalajahi, S., Saifullin, E. R., Marvanov, M. M., Baygildin, E. R., Sabiryanov, R. M., Rojas, A. A., Emelianov, D. A., Al-Muntaser, A. A., Ganiev, B., Zaripov, A. T., Beregovoi, A. N., & Shaihutdinov, D. K. (2021). Effect of copper stearate as catalysts on the performance of in-situ combustion process for heavy oil recovery and upgrading. Journal of Petroleum Science and Engineering, 207, 109125.

Amin, M. G., Sharear, S., Siddique, N., & Islam, S. (2013). Simulation of Ammonia Synthesis. American Journal of Chemical Engineering, 1(3), 59.

Volume XIX, Issue (1) (2023) 403-415

International May Conference on Strategic Management

THE EFFECT OF STRATEGIC LEADERSHIP ON ORGANIZATIONAL PERFORMANCE IN THE FINANCIAL INSTITUTIONS IN KENYA

Simon Irungu Kanji [1*], Ankit Katrodia[2], Fredrick Onyango Ogola[1]

[1]Strathmore University Business School, Strathmore University, Nairobi, Kenya; [2]School of Management Sciences, Northwest University, Mahikeng, South Africa

Abstract: Strategic leadership plays a pivotal role in the financial and non-financial performance of firms. Strategic leaders, through the unique characteristics they possess, and strategic relationships and decisions they make, contribute to the betterment of their firm performance. Strategic leadership is needful in financial institutions (banks, micro finance, insurance, etc.) as they promote economic development in countries. This study, based on contingency theory, focused on 305 respondents in financial institutions in Kenya. Specifically, the study sought to examine the characteristics of strategic leaders in financial institutions in Kenya, as well as the effect of strategic leadership in the performance of these institutions. Descriptive and inferential results show that strategic leaders in financial institutions in Kenya have strong interpersonal skills, are creative and innovative, and adopt strategic decisions to make their organizations competitive. Results also show that strategic leadership has a positive and significant effect on the performance of financial institutions in Kenya. It is therefore important to pay attention to strategic leadership in financial institutions in countries such as Kenya as they play a crucial role in economic development.

Keywords: strategic leadership, financial institutions, organizational performance, contingency theory, Situational leadership theory

1. INTRODUCTION

Although previous research has looked at diverse aspects of strategic management, for example the relationship between strategic leadership and the CEO's characteristics (Wang et al., 2016), strategic actions such as innovation capability and the potential to improve the performance of organizations (Mui et al., 2018), among others, little is known about the influence of strategic leadership on the performance of financial institutions in developing countries. Specifically, the role that strategic leaders play in steering financial institutions towards the attainment of organizational goals remains largely unexplored within the Kenyan context.

Generally, strategic leadership is a critical factor in determining the success of organizations. It involves the ability to anticipate and adapt to changes in the market, establish a clear vision and direction, and align resources and processes to achieve organizational goals (Finkelstein et al., 2009). A study by Hitt et al. (2017) found that strategic leadership positively impacts organizational performance by enhancing innovation, promoting organizational learning, and fostering a culture of excellence. Additionally, strategic leaders

[*] *Corresponding author: simon.kanji@strathmore.edu*

are responsible for creating a positive work environment and building effective teams, which are essential for achieving superior organizational performance (Owens & Hekman, 2012). Overall, strategic leadership plays a crucial role in enhancing organizational performance and should be a key priority for leaders seeking to improve their organization's success.

Strategic leaders exhibit a number of habits and characteristics which differentiate them from their non-strategic colleagues. According to Pisapia and Ellington (2013), strategic leaders think, act and work in strategic ways based on particular habits. For example, such leaders are agile, able to adapt new mindsets and principles that are helpful to their organizations, they are anticipating, artistic, and assuring to their team members, among others. Stamevska and Stamevski (2020) similarly observed that strategic leaders are considerate, compassionate towards their employees, they are socially aware, are self-controlled among other interpersonal skills. Strategic leaders, whose role in firms is multifunctional, focus on harmonizing internal and external organizational environments (Simsek, Jansen, Minichilli, & Escriba-Esteve, 2015). In relation to financial institutions, these habits and characteristics enable strategic leaders to position themselves and their employees in a way that will promote organizational performance.

In this regard, this study sought to examine the effect of strategic leadership on the performance of financial institutions in Kenya. Specifically, the study was guided by the following research questions:

i. What characterize strategic leadership in the financial institutions in Kenya?
ii. How does strategic leadership affect the performance of the financial institutions in Kenya?

1.1. Contingency theory

Contingency theory is a leadership theory that suggests there is no one-size-fits-all approach to leadership and that leadership effectiveness depends on the situation or context in which it is applied (Fiedler, 1964). The theory proposes that the effectiveness of a leader is influenced by three key factors: the leader's behaviour, the situational characteristics, and the degree of task structure (Fiedler, 1964). According to the theory, different leadership styles are more effective in different situations, and leaders must adapt their behavior to match the situational demands (Yukl, 2006). This theory highlights the importance of adapting leadership styles to match the situational demands for optimal effectiveness.

In contingency theory, leadership approach is not static but adaptive; it responds to the changing needs within the organizational environment. According to Donaldson (2001), organizations adopting contingency theory work towards avoiding misfits that arise from contingencies to the organizations. The foregoing author noted that there contingencies to organizations may arise in three areas: environment; organizational size; and organizational strategy. This implies that organizational leaders should not only be aware of the contingent issues that may arise, but more importantly, how to deal with them. The changing organizational context, it has been argued, requires leaders to be flexible by perfecting and completing what traditional leadership styles offer (Vidal et al., 2017). Further, Vidal et al noted that contingency theory offers a ‘middle-of-the-road’ model of leadership in the midst of many and sometimes confusing and contradictory leadership approaches.

Since strategic leaders aim at strategic decisions that lead organizations to develop a competitive advantage (Mahdi & Almsafir, 2014; Hunitie, 2018), a contingency theoretical approach is necessary. A contingency theory suggests a cocktail of approaches to leadership, implying that no one approach is sufficient. In the 21st Century there are characteristics of

strategic leader (such as sustainable innovation) who is ready to deal with the dynamism in the country (Lee & Trimi, 2021). Good leadership is the driving force towards the growth of the financial institutions. According to Özer and Tınaztepe (2014, p.779), 'Several leadership styles are relevant to strategic leadership, particularly those that focus on leader behavior and that have been the subject of more recent investigation'. Ahmed et al. (2020) observed that contingency theory is instrumental in driving innovation in organizations, more so in the current times of fierce competitions and technological changes in organizations globally. This therefore suggests that strategic organizational leaders need to be contingent in their approaches for them to make strategic decisions that will contribute to their firms' competitive advantage.

1.2. Situational leadership theory

Situational Leadership Theory (SLT), which is associated with Hersey and Blanchard (1969) argued that leadership style displayed depends on the situation at hand. Further, the two researchers observed that leadership in organizations is made up of these styles: directing or telling (where the leader 'tells' their followers what to do); selling or coaching (which is a more interactional process between leaders and their followers as leaders attempt to 'sell' their ideologies); participation or supporting (has lesser involvement of the leaders and more of the followers in the process of attainment of organizational processes); and delegating (which is more 'hands-off' approach as leader seeks to empower followers to work towards the attainment of organizational goals).

According to Graeff (1983), while situational leadership theory has weaknesses (i.e., being prescriptive), its importance lies in its situational application to leadership, as well as the important position given to organizational followers. An empirical study by Thompson and Glasø (2018) tested the variables in SLT and noted that close adherence to SLT's prescriptive guidelines is important. Specifically, they established that in-agreement between leaders and followers enhance organizational performance. Notably, the maturity of the followers in SLT mediates the relationship between leader behaviour and leader effectiveness (Blank et al., 1990), suggesting that the level of maturity of followers in SLT is crucial. Situational leadership is important as sometimes crises will arise in organizations. According to Garcia (2006) the ability to effectively and timely respond to an emerging crisis grants an organization a competitive advantage. Effective leaders are therefore those that can quickly assess and respond to a crisis and steer the organization towards greater performance, suggesting the need for situational leadership.

Situational leadership theory proposes that different situations require different leadership styles, and that the most effective leaders are those who can identify the needs of their followers and adjust their style accordingly (Hersey et al., 1977). The theory has been widely used in leadership development programs and has been shown to be effective in improving leadership effectiveness (Antonakis et al., 2012). Specifically, one of its key strengths is its emphasis on flexibility in leadership. By recognizing that different situations and followers require different approaches, leaders can better meet the needs of their team and achieve their goals. Moreover, situational leadership theory provides a useful framework for leadership development programs, which can help leaders identify their strengths and weaknesses and develop the skills necessary to be effective in different situations.

2. STRATEGIC LEADERS AND ORGANIZATIONAL PERFORMANCE

Samimi et al. (2020, p. 3) have defined strategic leadership as 'the functions performed by individuals at the top levels of an organization (CEOs, TMT members, Directors, General Managers) that are intended to have strategic consequences for the firm'. Samini et al. cited eight functions that strategic leaders engage in, which are: making strategic decisions; engaging with external stakeholders; performing human resource management activities; motivating and influencing; managing information; overseeing operations and administration; managing social and ethical issues; and managing conflicting demands. When carried out effectively, these functions enhance the performance of the organization.

Strategic leaders (such as CEOs, top executives, Board of Directors, Top Management Teams, etc.) are instrumental in the attainment of organizational goals. According to De Vries (1996), leaders who are strategic are able to make the most of the human resource present within an organization. De Vries, who focused on three leaders - Richard Branson (of Virgin Group of Companies), Jack Welch (of General Electric) and Percy Barnevik (of Asea Brown Boveri or 'ABB') - realized that the success of their companies rested on their strategic leadership. These leaders, for example, were accessible to their followers, had flat management structures, encouraged staff involvement at all levels, had in place self-managed teams, created cultures that rewarded staff at different levels and even ages, among others. Relatedly, Simsek et al. (2015) argued that strategic leaders in organizations not only shape the strategic decisions that organizations take, but also how and when they make these choices.

In order to bring about organizational performance, strategic leaders employ different workable approaches and strategies in their leadership. For example, in the wake of digital explosion, strategic leaders use avenues such as social media in a number of ways that contribute to positive organizational performance. Heavey et al. (2020) recently observed that social media provide an avenue for strategic leaders to engage with both their staff and clients, have convergence of ideas, and gain useful information regarding the organization, among others. This consequently provides them a chance to improve their affected areas of their organizations.

Strategic leadership also plays a critical role in driving the non-financial performance of organizations. According to Jabbar and Hussein (2015), strategic leadership is concerned with creating a vision for the organization and developing a roadmap for achieving it. Effective strategic leaders have the ability to align the organization's goals with its resources, capabilities, and external environment, and to inspire and motivate employees to achieve them (Cummings & Worley, 2014). This can result in a range of positive non-financial outcomes, such as increased innovation, enhanced customer satisfaction, improved employee engagement, and a stronger organizational culture (Kim & Mauborgne, 2015).

The global organizational environment has been changing, more so that of financial institutions. Digital disruptions, and now the recent covid-19 pandemic have forced organizations to rethink their stand in relation to how they work in order to realize their competitive advantage. Lee and Trimi (2021) have recently argued that only organizations that engage in sustainable innovation are able to survive in the turbulent times such as the covid-19 season. However, despite the dynamism in the workplace, there are expectations from the stakeholders to deliver returns. According to Crossan et al. (2008, p. 572) 'In the dynamic environment economic, technological, social political, moral ethical, tumultuous sea of change there is need for new theories, new applications, new thinking about leadership'. Hence this dynamism calls for strategic leadership which is crucial if organizations will progress and increase their performance. A transcendental leader is a strategic one who goes

above the normal, ordinary, or laid down strategies to meet the goals of the organization in different ways.

Because of the changing environments, the meso, macro and micro approach to leadership becomes important in examining how strategic leaders steer their organizations towards excellent performance. There is a lot of novelty within organizations requiring newer approach to strategy to be implemented by the strategic leader. Strategic leaders will necessarily make strategic choices, products and services of organizations, selection of key executives, and allocation of resources for them to improve their firm performance (Crossan et al., 2008, p.579).

But what would be the source of this dynamism within the financial institutions in Kenya that would invite such a level of change in the laid down strategies? Financial institutions in Kenya are on an upward trend of growth. Borrowing from Porters' five forces model; there is bargaining power of the suppliers, bargaining powers of the buyers, threats of new entrants into the financial sector, threat of substitutes and competitive rivalry within the financial institutions which calls for changes of strategies within the financial sector (Hasan, 2018). These changes can be attributed to increasing rates of changes which are disruptive and can sometimes be attributed to technology and are difficult to identify their causes or outcomes of competition or market actions. An example is the Covid-19 outbreak in the whole world. It was not planned within the financial institutions in Kenya. It has been very disruptive and outcomes in terms and market completion are not known. Only strategic leaders who can adapt to such technological changes will be able to meet the demands of their customers and optimize on their returns to stakeholders.

2.1. Financial institutions in Kenya

The financial sector in Kenya (i.e., banks, insurance sector, and the micro-finance sector) is fuelled by a moment of growth. All these sectors have different levels of management, but they need to give results in terms performance to the different stakeholders. Notably, the financial sector is surrounded by different environments such as political, social, economic, and managerial, which affect their performance. This surrounding environment and the level of expectations from different stakeholders require strategic leader who will steer the organization to high levels of performance which is the expectations of the stakeholders.

Financial institutions are at the heart of economic development of a nation, and their performance is of great interest to financial economists and other related stakeholders. This is even more important for developing economies where such institutions play a central role in the development of such contexts, for example through the provision of capital (Rogers, 2018). The financial services sector plays a crucial role in contributing to economic development by facilitating the efficient allocation of capital and resources within an economy. This happens through mobilizing funds, providing credit, facilitating trade, and managing risks. In developing countries, the financial services sector is even more crucial for economic development, as it can help to overcome the constraints that these countries often face, such as a lack of access to capital and limited infrastructure. By mobilizing savings, providing credit, and facilitating trade, the financial sector can help to spur economic growth and development in these countries. Consequently, the role that strategic leaders play in such institutions is of utmost importance as the concern is not just the institutions in question and its employees, but also the given country's development at large.

The banking sector has steadily grown in Kenya fuelled by factors such as digitization and agency banking (Gikandi & Bloor, 2010; Gitonga & Kiraka, 2019). Different studies have examined bank performance in Kenya and the factors associated with this. For example, in

their study Barako and Tower (2007) established that foreign ownership were positively associated with bank performance, while board and government ownership were significantly and negatively associated with bank performance. More recently, Kori et al. (2020) have argued for the need for strategic intelligence to enhance the performance of banks in Kenya, more so in the context of competitiveness and owing to their crucial role in economic development of the nation. Organizational capability in the banking sector is crucial for the attainment of set goals and objectives and needs to be given important consideration.

The strategic leader in the financial sector is supposed to understand the surrounding undertakings so as to enable them make decisions that will be able to help them align the People, resources, and values to the organizational goals. This requires creation of meaning and purpose in which if necessary changing aims and creating more organizational capabilities within the sectors (Kıyak et al., 2011). The strategic leadership focuses on the chief executive officers, top level management teams, Board of directors, managers in several branches who have the overall responsibilities within the organization of making major decisions that will affect the performance of the organization either in the positive or in the negative way (Özer & Tınaztepe, 2014; Samimi et al., 2020). Specifically, it concerns integrating the micro and macro, and meso perspectives into leadership as well as the unique abilities of anticipating, envisioning those leaders to the organizational transformation. The strategic leadership is concerned with having an adaptive capacity to respond to the dynamism and complexity of the external environment.

3. METHOD

This study was carried out among 39 commercial banks, 13 micro finance banks and 55 insurance companies 23 Investment banks and 175 Deposit taking Saccos. Questionnaires were issued to 305 respondents from each financial sector (chief personnel in middle level department of marketing, strategic management, auditing, finance and research and development). The sample was 305 respondents as shown in Table 1. Data was analysed descriptively and inferentially by with the help of SPSS tool and are reported in the next section based on the study objectives.

Table 1. Sampling frame

Firms	**Number**	**Percentage**
Insurances	55	18
Commercial banks	39	13
Microfinance banks	13	4
Investment banks	23	8
Deposit Taking SACCOs	175	57
Total	**305**	**100**

4. FINDINGS AND DISCUSSION

4.1. Characteristic of strategic leadership

Strategic leadership was examined on a five-point scale that ranged from ‘Never’ to ‘Always’, where various components that define strategic leadership were examined. Descriptive statistics percentage, mean and standard deviation analysed the data. In Table 1 majority (39%) reported that their leaders often give advance notice to changes, (44%) often make their attitude clear to followers and (39%) alluded that their leaders tried new ideas

irrespective of their groups. It was notable to report that leaders in financial institutions occasionally keep unto themselves (mean =2.6).

Further, majority (38%) reported that their leaders assign specific groups certain task, 36% of leaders often schedule work to be done and 37% always maintain certain standards of performance. Moreover, 35% reported that their leaders often encourage use of harmonized procedure, or they are willing to make changes. 35% reported that their leaders always communicate effectively to their group or their operationalize suggestions from group members. 43% reported that their leaders always encouraged compliance with standard operating procedures. 24% reported that their leaders seldom dictate what ought to be done.

Table 2. Strategic leadership

	Never	Seldom	Occasionally	Often	Always	Mean	Std Dev
Gives advance notice to changes	1	9	24	39	28	3.9	0.9
Makes his or her attitude clear to followers	4	8	19	44	25	3.8	1.0
Does limited to make it to be a pleasant group member	6	13	33	31	17	3.4	1.1
Our leaders try new ideas in respective groups	2	9	27	39	24	3.8	1.0
Our leaders keep unto themselves	25	28	19	16	12	2.6	1.3
Our leaders look upon the welfare of individual group members	5	15	23	34	23	3.5	1.2
Our leaders assign specific groups certain tasks	3	7	27	38	26	3.8	1.0
Our leader's schedules work to be done	3	7	28	36	26	3.7	1.0
Our leaders maintain certain standards of performance	1	8	17	37	37	4.0	1.0
Our leaders do not explain their actions	24	22	22	21	11	2.7	1.3
Our leaders act without consulting groups	31	21	23	15	10	2.5	1.3
Our leaders treat group members as equal members	5	7	28	33	28	3.7	1.1
Our leaders encourage use of harmonized procedures	3	7	23	35	32	3.9	1.1
Our leaders are always willing to make changes	3	8	24	35	30	3.8	1.1
Our leaders communicate effectively to group members	3	5	26	31	35	3.9	1.0
Our leaders are approachable and friendly	3	7	19	35	36	4.0	1.0
Our leaders encourage compliance with standard rules and procedures	3	6	16	32	43	4.1	1.0
Our leaders allow to know what is expected unto them	1	9	23	33	34	3.9	1.0
Our leaders operationalize suggestions from group members	4	11	19	31	35	3.8	1.1
Our leaders dictate what and how to be done	18	24	17	19	22	3.0	1.4

Findings from the first objective which focused on the characteristics of strategic leadership in financial institutions showed that these leaders had a number of characteristics which touched on their personal and interpersonal skills, how they run their organizations, among others. From the study, it emerged that strategic leaders in the financial sector are

effective in their communication, and supportive towards their staff, and this was demonstrated by the advance notice they gave on upcoming changes, making their attitudes clear to staff, communicating effectively, and rarely dictating what needed to be done. Pisapia and Ellington (2013) observed that strategic leaders are not only agile but supportive towards their organizational staff. Similarly, Stamevska and Stamevski (2020) revealed that strategic leaders were compassionate and supportive to their staff, and had great interpersonal skills, which also mirror the findings in this study.

Results in this study also show that although leaders did not dictate the work to be done, they assigned roles strategically, and even scheduled specific tasks. De Vries (1996) argued that strategic leaders make the most of their human resource with the aim of creating a competitive advantage for their firms. To achieve such, De Vries noted that these leaders encouraged staff at all levels and created cultures that enhanced firm performance. the study also showed that the leaders were creative, trying out new things for their organizations, even though they had standard procedures for carrying out specific tasks. Studies by both Ahmed et al. (2020) as well as the one by Mui et al. (2018) demonstrated that strategic leaders adopt creativity and innovation so as to improve performance in their organizations, just as was the case in this study. Simsek et al. (2015) further argued that strategic leaders are keen on harmonizing the internal environment of the organization with the external one. As Vidal et al. (2017) observed, strategic leaders are contingent and utilize a number of approaches with the aim of making their firms competitive. This was demonstrated in the findings in the first objective.

4.2. Strategic leadership and performance

An examination of performance in Table 3 indicates that majority 52% reported that there was better return on assets, 44% reported either better return on sales or return on investment in relation to strategic leadership. 41% reported better profit growth or margins in their firms. 35% reported better changes in annual divided and annual interest on rebate growth.

An examination of non-financial performance was evaluated through a five-point Likert scale. Respondents were requested to indicate their level of agreement ranging from strongly disagree to strongly agree. Findings are summarized in Table 4.7. Majority 42% agreed and 41% strongly agreed that their organization have reasonable number of loyal customers. 44% agreed and 33% strongly agreed that they have strategy for continued review of customer feedback on quality of their services. 42% agreed and 40% strongly agreed that they have strategies for recruitment of new customers. 48% agreed and 24% strongly agreed that their clientele is satisfied with the quality of service they are offering. 35% agreed and 32% strongly agreed that their customer base growth is pegged on customers' referrals. 41% agreed and 8% disagreed that their organization has robust strategies of retaining existing customers. 46% agreed and 26% strongly agreed that those referred to their services remains loyal to them. 42% agreed and 41% strongly agreed that their employees are continuously involved in management of their clients.

Table 3. Descriptive statistics on non-financial performance

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Std. Dev.
Our organization have reasonable number of loyal customers	2	1	14	42	41	4.2	0.9
We have strategy for continued review customer feedback on quality of our services	2	5	16	44	33	4.0	0.9
We have strategies for recruitment of new customers	1	3	14	42	40	4.2	0.9
Our clientele is satisfied with the quality of service we are offering	3	7	18	48	24	3.8	1.0
Our customer base growth is pegged on customers referrals	2	6	26	35	32	3.9	1.0
Our organization has robust strategies of retaining existing customers	1	8	16	41	34	4.0	1.0
Those referred to our services remains loyal to our services	3	5	21	46	26	3.9	0.9
Our employees are continuously involved in management of our clients	1	6	11	42	41	4.2	0.9

4.2.1. Descriptive statistics on financial performance

An evaluation on financial performance of financial services sector in Kenya was examined on a five-point Likert scale. Results in Table 4 indicate that 52% reported that there was a better improvement on their return on assets in relation to resources, process and values. Majority mean = 3.8 reported that there were better changes in return on sales, profit margins and market share growth. Majority mean = 3.9 reported that there was a much better return on investments and profit growth. Majority mean =3.6 reported that there were better changes in annual dividend paid and interest growth in rebate.

Table 4. Descriptive statistics on financial performance

	Much worse	Worse	Similar	Better	Much better	Mean	Std. Dev.
Return on assets	1	3	24	52	20	3.9	0.8
Return on sales	2	5	26	44	23	3.8	0.9
Return on investments	1	5	26	44	24	3.9	0.9
Profit margins	3	4	27	41	26	3.8	0.9
Sale growth	1	9	23	42	26	3.8	1.0
Market share growth	3	6	26	38	28	3.8	1.0
Profit growth	1	8	21	41	29	3.9	1.0
Annual dividend paid	6	7	30	35	22	3.6	1.1
Interest on rebate growth	6	4	35	35	20	3.6	1.0

Simple ordered logit regression analysis was carried out to examine the effect of strategic leadership on organization performance of financial institutions in Kenya. Results in Table 5 have AIC of 283.213 and BIC of 298.365, likelihood chi square of 57.786 and p value of 0.000. Thus, there is a significant prediction of strategic leadership when compared with a model with nil predictors. Strategic leadership accounts for 17.5% of changes in organization performance of financial institutions in Kenya. Strategic leadership has positive and

significant effect on organization performance of financial institutions in Kenya (β = 1.764, p value < 0.05). Hence, we can conclude that unit increase in strategic leadership increases by 1.764 in the log odds of financial institution performance in Kenya.

Strategic leadership has a tangible effect on organizations, and this is demonstrated in firm performance. Results for the second objective demonstrated that strategic leadership contributed to better return on assets, sales, growth in profits, return on investments, better dividends and rebate growth. Further, regression analysis showed that strategic leadership had positive and significant effect on the performance of the financial institutions in Kenya. According to Crossan, Vera, and Nanjad (2008), strategic leaders adopt a number of approaches and strategic decisions that better the performance of their organizations. This often calls for contingent approaches to arising situations within their organizations and around such firms (Donaldson, 2001; Vidal et al., 2017).

In order to be creative and innovative, one of the ways that strategic leaders utilize is social media platforms where they engage with both their external and internal clients. Heavey et al. (2020) in their study opined that strategic leaders use social media to engage with staff on areas of organizational improvements, for example by sourcing for feedback from their own staff. Further, such leaders utilize these platforms to interact with their external clients and establish their areas of interests as far as the organization is concerned and possible challenges. Strategic leaders therefore make use of the media available to them to better relations with internal and external stakeholders, and consequently, improve their performance.

Table 5. Ordered regression

	Coef.	**Std Error**	**t-value**	**p-value**	**[95% Conf]**	**Interval**	**Sig**
Strategic leadership	1.764	0.263	6.71	0.00	1.249	2.279	***
cut1	0.172	1.209			-2.197	2.541	
cut2	2.081	0.87			0.376	3.786	
cut3	4.553	0.876			2.836	6.271	
cut4	8.034	1.06			5.956	10.112	
Mean dependent var	3.98	SD dependent var	0.748				
Pseudo r-squared	0.175	Number of observations	153				
Chi-square	57.786	Prob > chi^2	0.000				
Akaike crit. (AIC)	283.213	Bayesian crit. (BIC)	298.37				

*** p<.01, ** p<.05, * p<.1

5. CONCLUSIONS AND RECOMMENDATIONS

Strategic leadership is instrumental to the growth and performance of financial institutions in countries such as Kenya, where this sector plays an important role in economic development. Through a contingency and situational theory approach, this study has demonstrated that strategic leaders have strong interpersonal skills, are creative and innovative, and are strategic in their operations and decisions. Thus, their cocktail of approaches to arising issues contributes to the success of their organizations. Further, the study has shown that strategic leadership has a positive and significant effect on organizational performance since it affects areas such as sales, return on assets, profitability

growth, etc. This therefore suggests the need to focus on strategic leadership in the financial institutions in Kenya and other related countries if economic development is to be witnessed.

Strategic leadership is crucial for the success of financial institutions, as it enables them to adapt to the ever-changing market conditions, remain competitive, and achieve their goals. Effective strategic leaders in financial institutions in contexts such as Kenya have the ability to identify emerging trends, opportunities, and risks, and formulate and execute strategies that align with the institution's objectives. They also have a clear vision and communicate it effectively to the entire organization, fostering a sense of direction and purpose. Furthermore, strategic leaders in financial institutions prioritize the development of a strong and sustainable organizational culture, one that fosters innovation, encourages collaboration, and promotes ethical behavior. Overall, strong strategic leadership is essential for financial institutions to thrive and remain relevant in a highly dynamic and competitive industry.

REFERENCES

Ahmed, W., Najmi, A., & Ikram, M. (2020). Steering firm performance through innovative capabilities: A contingency approach to innovation management. Technology in Society, 63, 101385.

Antonakis, J., Day, D. V., & Schyns, B. (2012). Leadership and individual differences: At the cusp of a renaissance. The Leadership Quarterly, 23(4), 643-650.

Barako, D. G., & Tower, G. (2007). Corporate governance and bank performance: Does ownership matter? Evidence from the Kenyan banking sector. Corporate Ownership and Control, 4(2), 133-144. Retrieved from http://virtusinterpress.org/IMG/pdf/10-22495_cocv4i2p13.pdf

Blank, W., Green, S. G., & Weitzel, J. R. (1990). A test of the situational leadership theory. Personnel Psychology, 43(3), 579-597.

Crossan, M., Vera, D., & Nanjad, L. (2008). Transcendent leadership: Strategic leadership in dynamic environments. The Leadership Quarterly, 19(5), 569-581.

Cummings, T. G., & Worley, C. G. (2014). Organization development and change. Boston, MA: Cengage learning.

De Vries, M. K. (1996). Leaders who make a difference. European Management Journal, 14(5), 486-493.

Donaldson, L. (2001). The contingency theory of organizations. London, UK: Sage.

Finkelstein, S., Hambrick, D. C., & Cannella, A. A. (2009). Strategic leadership: Theory and research on executives, top management teams, and boards. Oxford, UK: Oxford University Press.

Garcia, H. F. (2006). Effective leadership response to crisis. Strategy & Leadership. Strategy & Leadership, 34(1), 4-10.

Gikandi, J. W., & Bloor, C. (2010). Adoption and effectiveness of electronic banking in Kenya. Electronic Commerce Research and Applications, 9(4), 277–282.

Gitonga, M. K., & Kiraka, R. K. (2019). The effect of banking services on the business performance of bank agents in Kenya. Cogent Business & Management, 6(1), 1-15.

Graeff, C. L. (1983). The situational leadership theory: A critical view. Academy of Management Review, 8(2), 285-291.

Heavey, C., Simsek, Z., Kyprianou, C., & Risius, M. (2020). How do strategic leaders engage with social media? A theoretical framework for research and practice. Strategic Management Journal, 41(8), 1490-1527.

Hersey, P., & Blanchard, K. H. (1969). Life cycle theory of leadership. Training & Development Journal, 23(5), 26-34. Retrieved from https://psycnet.apa.org/record/1970-19661-001

Hersey, P., Blanchard, K. H., & Johnson, D. E. (1977). Management of organizational behavior (10th ed.). Englewood Cliffs, NJ: Pearson.

Hitt, M. A., Ireland, R. D., & Hoskisson, R. E. (2017). Strategic management: Concepts and cases: competitiveness and globalization. Boston, MA: Cengage Learning.

Hunitie, M. (2018). Impact of strategic leadership on strategic competitive advantage through strategic thinking and strategic planning: a bi-meditational research. Verslas: teorija ir praktika, 19(1), 322-330. Retrieved from https://www.econstor.eu/bitstream/10419/247952/1/166795329X.pdf

Jabbar, A. A., & Hussein, A. M. (2015). The role of leadership in strategic management. International Journal of Research - Granthaalayah, 5(5), 99-106.

Kim, W. C., & Mauborgne, R. (2015). Blue ocean strategy, expanded edition: How to create uncontested market space and make the competition irrelevant. Harvard Business Review Press, 1-11. Retrieved from http://www.teraits.com/pitagoras/marcio/pgp/p_BlueOceanStrategy.pdf

Kıyak, M., Bozaykut, T., Güngör, P., & Aktas, E. (2011). Strategic leadership styles and organizational financial performance: a qualitative study on private hospitals. Procedia-Social and Behavioral Sciences, 24, 1521-1529.

Kori, B. W., Muathe, S., & Maina, S. M. (2020). Financial and non-financial measures in evaluating performance: The role of strategic intelligence in the context of commercial banks in Kenya. International Business Research, 13(10), 130-142.

Mahdi, O. R., & Almsafir, M. K. (2014). The role of strategic leadership in building sustainable competitive advantage in the academic environment. Procedia-Social and Behavioral Sciences, 129, 289-296.

Mui, H. K., Basit, A., & Hassan, Z. (2018). The impact of strategic leadership on organizational performance of small medium enterprises (SME) in Malaysia. Journal of Leadership and Management, 13, 154-166.

Owens, B. P., & Hekman, D. R. (2012). Modeling how to grow: An inductive examination of humble leader behaviors, contingencies, and outcomes. Academy of Management Journal, 55(4), 787-818.

Ozer, F., & Tinaztepe, C. (2014). Effect of strategic leadership styles on firm performance: A study in a Turkish SME. Procedia - Social and Behavioral Sciences, 150(14), 778-784.

Pisapia, J., & Ellington, L. (2013). The strategic leader: Bringing the habits to life. Charlotte, NC.: IAP.

Rogers, M. (2018). Financial institutions and markets. In M. Blum, & C. Colvin (Eds.), An economist's guide to economic history (pp. 87-94). Cham, Switzerland: Palgrave Macmillan, Cham.

Samimi, M., Cortes, A. F., Anderson, M. H., & Herrmann, P. (2020). What is strategic leadership? Developing a framework for future research. The Leadership Quarterly, 1-22.

Simsek, Z., Jansen, J. J., Minichilli, A., & Escriba-Esteve, A. (2015). Strategic leadership and leaders in entrepreneurial contexts: A nexus for innovation and impact missed? Journal of Management Studies, 52(4), 463-478.

Stamevska, E., & Stamevski, V. (2020). Decisions and skills of the strategic leaders. Economics and Management, XVII(1), 140-146. Retrieved from http://194.141.86.238/joomla/images/SpisanieIkonomikaupload/SpisanieIkonomika2020/_vol.XVII_issue_1_2020-140-146.pdf

Thompson, G., & Glasø, L. (2018). Situational leadership theory: a test from a leader-follower congruence approach. Leadership & Organization Development Journal, 39(5), 574-591.

Vidal, G. G., Campdesuñer, R. P., Rodríguez, A. S., & Vivar, R. M. (2017). Contingency theory to study leadership styles of small businesses owner-managers at Santo Domingo, Ecuador. International Journal of Engineering Business Management, 9, 1-11.

Wang, G., Holmes Jr, R. M., Oh, I. S., & Zhu, W. (2016). Do CEOs matter to firm strategic actions and firm performance? A meta-analytic investigation based on upper echelons theory. Personnel Psychology, 69(4), 775-862.

Yukl, G. (2006). Leadership in organizations (6th ed.). Upper Saddle River, NJ.: Pearson.

Volume XIX, Issue (1) (2023) 416-425

International May Conference on Strategic Management

DECODING THE HYPE: A PRAGMATIC INVESTIGATION OF MARKETING OPPORTUNITIES WITHIN THE METAVERSE AND FUTURE RESEARCH AGENDAS

Khalil Israfilzade*

ADA University, Azerbaijan

Abstract: The advent of the Metaverse as an emergent and rapidly evolving virtual environment presents both opportunities and challenges for marketing practitioners and researchers. This literature review critically and pragmatically examines the existing body of knowledge on marketing in the Metaverse, elucidating potential research areas and topics while emphasizing the importance of adopting a balanced and sceptical approach. The review explores four key research domains: customer behaviour and engagement, ethical marketing and social responsibility, evaluation and performance measurement, and technological advances and marketing integration. By identifying constraints, biases, and areas necessitating further investigation, this review provides valuable insights for organizations navigating the uncertain terrain of the Metaverse. The paper encourages future research to delve into the long-term implications of the Metaverse, focusing on its potential impact on society, culture, and the economy. It also advocates for interdisciplinary studies that contribute to a comprehensive understanding of the Metaverse and its effects on marketing strategies and practices. By adopting a critical and pragmatic approach, this literature review aims to guide researchers and practitioners in successfully harnessing the potential of the Metaverse while mitigating risks and fostering responsible, ethical marketing practices in this dynamic virtual landscape.

Keywords: Customer Behaviour, Customer Engagement, Immersive Customer Experience, Metaverse Marketing, Ethical Marketing

1. INTRODUCTION

The Metaverse, a concept that originated in science fiction, has rapidly evolved into a highly debated and complex digital landscape. With its potential to impact various aspects of marketing, customer behaviour, and technological innovation, the Metaverse presents both opportunities and challenges for businesses. However, it is essential to maintain a critical and pragmatic approach when examining its implications on marketing practices.

This literature review objectives to provide a balanced analysis of the current research on the Metaverse, focusing on its origins, evolution, and influence on customer behaviour and engagement, while also considering the ethical implications and the role of technology in shaping marketing strategies.

As the Metaverse is predicted to transform various industries, including marketing, fashion, technology, and gaming, it is vital to explore this convergence of physical reality and

* *Corresponding author: kisrafilzada@ada.edu.az*

digital virtuality (De Felice et al., 2023; Dwivedi et al., 2023; Lim, 2023; Rathore, 2023). Some proponents argue that the Metaverse will evolve the Internet into a virtual 3D social media world, offering new and captivating user experiences (Hollensen et al., 2022). However, sceptics (Robertson, 2021; MacDonald, 2022; Wankhede, 2022) argue that the Metaverse is an ill-defined concept with no tangible product or purpose, raising concerns about its legitimacy and impact.

This paper delves into the marketing implications of the Metaverse with a critical lens, aiming to provide managers and academics with a better-informed perspective. The research is centred around four key areas of scepticism:

I. Customer Behaviour and Engagement.
II. Ethical Marketing and Social Responsibility
III. Evaluation and Performance Measurement
IV. Technological Advances and Marketing Integration

Drawing on a literature review, the paper first explores the concept of the Metaverse in general and its relevance to marketing. Finally, the paper offers suggestions for future research directions, paving the way for a more comprehensive understanding of the Metaverse's potential and limitations.

The article *"A Sceptical View of Opportunities Marketing in the Metaverse"* explains the Metaverse's implications in a marketing context by taking a sceptical approach to critical categories like customer experiences, trust, engagement, and advertising. The author concludes the article by encouraging firms to be cautious and sceptical when developing any metaverse marketing strategy. As a result, there is plenty of room for trial and error before launching the final business activities.

2. LITERATURE REVIEW

In today's competitive landscape, merely offering high-quality products and services is no longer enough, as most are homogeneous and the local and global markets fiercely compete (Israfilzade, 2021). As portrayed by media and early-stage companies, the Metaverse may seem like a futuristic concept where individuals use avatars to represent themselves, interact, build communities, and trade digital currencies for various goods and services (De Felice et al., 2023; Dwivedi et al., 2023; Lim, 2023). However, upon closer examination, one can argue that such technologies already exist and have been utilized for years, particularly in the gaming industry.

Some proponents assert that the Metaverse is the inevitable next step in the evolution of the Internet, a 3D counterpart accessible through a unified access point. However, others (Hollensen et al., 2022; De Felice et al., 2023; Dwivedi et al., 2023) contend that the Metaverse is simply an additional 3D layer built upon the traditional 2D Internet. According to Zhao et al. (2022), the Metaverse is still in its nascent stages. No research systematically summarises the technical framework for its complete visual construction and exploration, nor examines graphics, interaction, and visualization separately from the Metaverse's perspective.

By organizing the review into four key research domains, namely customer behaviour and engagement, ethical marketing and social responsibility, evaluation and performance measurement, and technological advances and marketing integration, this study offers a comprehensive examination of the current state of research in the field.

2.1. The Metaverse: Origins and Evolution

The origin of the term meta (μετά) is Greek, and its meaning is "after, behind, among, between, modified, changed, higher, beyond." In Greek, the prefix meta- is less arcane than in

English; Greek meta- is closely related to the Latin words post- or ad-. In its most basic form, meta- characterises a topic in a way that extends and transcends its fundamental boundaries of the object or uses the subject as an object of interpretation (particularly in epistemology).

The Metaverse's roots can be traced back to science fiction literature, with the earliest concepts appearing in the works of William Gibson and Neal Stephenson. Gibson's 1984 novel (Gibson, 1984), *"Neuromancer,"* introduced the idea of a worldwide computer network called "cyberspace," while Stephenson's *"Snow Crash"* (Stephenson, 1992) provided a more detailed vision of a virtual reality-based Metaverse. Furthermore, one of the novel's (Snow Crash) central elements of anxiety is the merging of ontological limits, as the Metaverse and Reality are meant to be distinct.

Early Virtual Worlds. The development of early virtual worlds, such as Second Life at 2003 and World of Warcraft at 2004, marked the beginning of the Metaverse's evolution (Kock, 2008). These platforms enabled users to interact with one another in a shared digital environment, paving the way for more advanced virtual reality systems.

The Metaverse's development has been driven by technological advancements in VR, AR, and blockchain technology. VR and AR technologies have allowed for more immersive and interactive digital experiences, while blockchain has provided secure and decentralized systems for virtual asset ownership and exchange. The gaming industry has been integral to the Metaverse's evolution, with platforms like Fortnite and Roblox popularizing shared virtual spaces (Jungherr & Schlarb, 2022).

Nevertheless, "Metaverse" did not become a common phrase until October 2021, when Facebook renamed its brand name to Meta. At that time, the business declared its intention to invest $10 billion over the following year in technology to realise its vision of the metaverse (Rodriguez, 2021). Mark Zuckerberg, the owner of Meta (previously known as Facebook), predicts that it could take between five and ten years for the metaverse's primary capabilities to become widespread.

There is considerable controversy around the justification for this rebranding and the long-term viability of this massive investment. It is also reported (Bowman, 2023; Harrison, 2023) that companies are more concerned with promoting the potential of the metaverse rather than addressing immediate financial concerns and challenges. However, this is not the purpose of the present research, but it is obvious that Facebook sparked and highlighted this topic, attracting not only more users and developers, but also more investors and academics.

In short, technological advancement has been a driving element in the evolution of the Metaverse. Computing power, graphics rendering, and networking capabilities have all improved over time, allowing for the creation of increasingly immersive virtual environments. The widespread deployment of high-speed Internet has also enabled early adopters to interact in these virtual worlds in real-time, however, this is far from perfect and is unlikely to be acceptable to a wider audience with the current version of it.

Despite significant advancements in technology, there remain limitations that could hinder the full realization of the Metaverse. Current virtual reality and augmented reality systems still face challenges in terms of latency, processing power, and user comfort. Overcoming these limitations will require further technological breakthroughs, which may take ***years*** or even ***decades*** to materialize.

2.2. Customer Behaviour and Engagement.

A growing body of research on customer behaviour and engagement (Israfilzade & Babayev, 2020; Mittal & Bansal, 2023) has also resulted from the metaverse's expanding popularity. To gain a comprehensive comprehension of the topic, it is essential to evaluate

critically the underlying assumptions and methodologies of these studies. This literature review examines the current research with scepticism and identifies potential biases and limitations.

Although customer engagement and retention are important for business success in the metaverse (Valaskova et al., 2022), it is necessary to approach this area with a balanced perspective. Identifying the factors that contribute to customer engagement in the metaverse and considering whether these factors differ significantly from those in traditional online environments can help businesses develop effective strategies.

Customer behaviour research in the metaverse may make assumptions regarding the applicability of traditional marketing theories and consumer behaviour models to virtual environments. Given the metaverse's unique properties (Valaskova et al., 2022; Mittal & Bansal, 2023), such as the immersive nature of virtual reality and the blurred borders between reality and virtual experiences, this premise may not always hold true. Furthermore, self-reported data may be influenced by social desirability bias and faulty retention. Identifying any unique factors that drive customer behaviour in the metaverse and assessing their impact on purchasing decisions could provide valuable insights for businesses.

Building Trust and Authenticity. In the metaverse, building trust and authenticity may be important for businesses to attract and maintain a customer base (Tsai, 2022; Ramadan, 2023; Zhang et al., 2023). However, it is worth considering whether the mechanisms for establishing credibility and trustworthiness in the metaverse are fundamentally different from those in other digital spaces. Exploring the effectiveness of existing trust cues in the metaverse and their implications for marketing strategies can help businesses navigate this new environment. The literature on building customer trust and authenticity in the metaverse primarily focuses on a limited set of factors, such as user interface design and social presence (Golf-Papez et al., 2022). However, trust is a multifaceted construct that involves both cognitive and emotional aspects. By not considering the full range of factors that contribute to trust, these studies may provide an incomplete picture of the role of trust in shaping customer behaviour.

Personalization and customization in marketing refer to tailored communication and product offerings based on individual customers' preferences, behaviours, and characteristics. In virtual environments, this approach becomes increasingly relevant as it enables marketers to adapt their strategies to the unique context of the metaverse, where customers' digital identities and online interactions provide valuable insights into their preferences. Research on the effectiveness and ethical implications of personalized marketing strategies in virtual environments is still in its infancy. Despite some studies (Dwivedi et al., 2023; Rathore, 2023) highlighting the potential benefits of personalized marketing approaches, the lack of empirical evidence and the potential ethical concerns associated with personalization call for more in-depth exploration of the subject.

Lack of *cultural differences research*. In the metaverse, cross-cultural studies on customer behaviour frequently lack a standardised research methodology, resulting in conflicting findings and interpretations. Furthermore, the literature focuses mostly on Western cultural contexts, limiting the findings' generalizability to other cultural settings. This Eurocentric bias may obstruct a thorough understanding of culture's role in shaping consumer behaviour in virtual worlds.

Word-of-mouth and Viral Marketing. The metaverse may offer new opportunities for word-of-mouth and viral marketing (Tsai, 2022; Ramadan, 2023), but it is important to remain cautious in our expectations of the effectiveness of these strategies. Exploring the factors that influence the spread of information in the metaverse and comparing the efficacy of viral marketing campaigns in the metaverse with those in other digital spaces can help businesses make informed decisions about whether to invest in viral marketing efforts in the metaverse.

2.3. Ethical Marketing and Social Responsibility

The ethical implications of personalization, customization, and responsible marketing practices in the metaverse warrant further investigation. Businesses should focus on sustainable and green marketing, diversity, equity, and inclusion to maintain a positive reputation (Golf-Papez et al., 2022; De Felice et al., 2023). Evaluating these practices' effectiveness and their impact on consumer perceptions, loyalty, and protection can provide valuable insights, aiding businesses in developing effective strategies and promoting ethical standards in the virtual environment.

Ethical Implications. The ethical implications of personalization and customization in virtual environments warrant further investigation. One prominent ethical concern is the potential invasion of privacy (Golf-Papez et al., 2022), as the collection and usage of customers' personal data for targeted marketing efforts may infringe on their right to privacy. Moreover, the use of algorithms and artificial intelligence for personalization raises concerns related to bias and discrimination, as these technologies might inadvertently perpetuate stereotypes or unequal treatment based on customers' characteristics.

Responsible Marketing Practices. Responsible marketing practices in the metaverse are important for businesses to maintain a positive reputation and uphold ethical standards (Anshari et al., 2022). While the metaverse may present unique challenges, it is essential to remain pragmatic when assessing the implications of marketing strategies in this new environment. Evaluating the effectiveness of responsible marketing practices in the metaverse and their impact on consumer perceptions and loyalty can provide valuable insights for businesses.

Sustainable and Green Marketing. Any company that wants to thrive in the face of the current economic and environmental challenges must make environmentally conscious decisions regarding their marketing strategies and focus on green approaches (Aghayev & Israfilzade, 2022). Sustainable and green marketing in the metaverse is an area worth exploring, as businesses seek to demonstrate their commitment to environmental and social responsibility. However, it is crucial to remain cautious in our expectations of the effectiveness of these strategies in driving consumer preferences and behaviours. Comparing the impact of sustainable and green marketing initiatives in the metaverse with those in other digital environments can help businesses determine the best practices for their marketing efforts.

Diversity, Equity, and Inclusion. Promoting diversity, equity, and inclusion in the metaverse is essential for businesses to create a welcoming and inclusive environment for all users. It is important to consider whether the metaverse presents unique opportunities or challenges for businesses in fostering diverse and inclusive communities. Examining how businesses can effectively address diversity, equity, and inclusion in the metaverse can provide recommendations for creating a more inclusive digital space.

Consumer protection and *advocacy* are important considerations for businesses operating in the metaverse (Tsai, 2022; Ramadan, 2023; Zhang et al., 2023). Nevertheless, it is necessary to approach this area with a balanced perspective, considering whether consumer protection issues in the metaverse differ significantly from those in traditional online environments. Identifying the factors that contribute to consumer protection in the metaverse and assessing their implications for businesses can help develop effective strategies for safeguarding consumer rights and interests.

2.4. Evaluation and Performance Measurement

Measuring marketing performance in the metaverse is an important area to explore for businesses seeking to optimize their strategies in this new environment (Tsai, 2022; Ramadan,

2023). While the metaverse may offer new opportunities and challenges, it is important to remain pragmatic when assessing the marketing performance. Comparing the effectiveness of marketing performance metrics in the metaverse with those in other digital environments can help businesses identify the most relevant indicators for their marketing efforts.

Consumer sentiment analysis and *brand perception* in the metaverse can provide valuable insights for businesses looking to enhance their brand image and reputation (Li, 2022). However, it is crucial to remain cautious in our expectations of the effectiveness of sentiment analysis techniques in this new environment. Comparing the impact of sentiment analysis and brand perception initiatives in the metaverse with those in other digital environments can help businesses determine the best practices for managing their brand reputation and understanding consumer sentiment.

2.5. Technological Advances and Marketing Integration

The exploration of AI-driven marketing strategies within the metaverse presents an intriguing domain for businesses striving to optimize their marketing endeavours (Huang & Rust, 2021). While the metaverse may provide novel opportunities for AI implementation, maintaining a pragmatic outlook on the efficacy of these strategies is essential. By comparing the ramifications of AI-driven marketing initiatives in the metaverse to those in other digital environments, businesses can identify best practices for harnessing AI in their marketing efforts.

Data-driven marketing and analytics in the metaverse have the potential to yield valuable insights for businesses seeking to make informed decisions and enhance their marketing strategies. Nonetheless, it is critical to exercise caution in anticipating the effectiveness of data-driven marketing techniques within this novel environment (Huang & Rust, 2021). A comparative analysis of the impact of data-driven marketing and analytics initiatives in the metaverse and other digital environments can assist businesses in determining the most effective practices for employing data to inform their marketing decisions.

3. FUTURE RESEARCH AGENDAS

The proposed research areas and topics related to marketing in the metaverse encompass a wide range of avenues for exploration, including customer behaviour and engagement, ethical marketing and social responsibility, evaluation and performance measurement, and technological advances and marketing integration. As a result, Table 1 summarises all possible research areas, avenues, and topics.

Table 1. Future research agenda marketing opportunities within the metaverse

Research area	*Research Avenues*	*Possible research topics*
I. Customer Behaviour and Engagement	1. Understanding Customer Behaviour	Strategies and tools for establishing credibility and promoting positive customer experiences.
	2. Building Trust and Authenticity	Analysis of customer preferences, demographics, motivations, and social interactions.
	3. Personalization and Customization	Examining the effectiveness and potential ethical implications of personalized marketing strategies in virtual environments.

	4. Cultural Differences	A cross-cultural analysis of marketing strategies, consumer behaviour, and adaptation to diverse audiences.
	5. Customer Retention and Engagement	Identifying factors that influence long-term customer engagement and loyalty within the metaverse.
	6. Word-of-mouth and Viral Marketing	Exploring the dynamics of user-generated content and peer recommendations in shaping consumer perceptions and brand reputation.
II. Ethical Marketing and Social Responsibility	1. Responsible Marketing Practices	Developing ethical guidelines and best practices for marketing in virtual environments while balancing consumer privacy and business objectives.
	2. Sustainable and Green Marketing	Investigating strategies for promoting environmentally responsible consumption and production within virtual spaces.
	3. Diversity, Equity, and Inclusion	Examining the role of marketing in fostering an inclusive and equitable virtual environment that caters to diverse user groups.
	4. Consumer Protection and Advocacy	Assessing the potential risks and challenges in ensuring consumer rights and fair marketing practices in virtual environments.
III. Evaluation and Performance Measurement	1. Measuring Marketing Performance	Developing reliable metrics, methodologies, and frameworks for assessing the effectiveness of marketing campaigns in virtual environments.
	2. Consumer Sentiment Analysis and Brand Perception	Assessing the impact of metaverse marketing campaigns on consumer emotions, brand perception, and long-term loyalty.
IV. Technological Advances and Marketing Integration	1. AI-driven Marketing Strategies	Exploring the potential benefits, challenges, and limitations of utilizing artificial intelligence and machine learning in marketing campaigns.
	2. Data-driven Marketing and Analytics	Assessing the potential opportunities and challenges in leveraging user data for targeted marketing and performance optimization.

In the domain of ***Customer Behaviour and Engagement***, understanding customer behaviour is essential for establishing credibility and promoting positive customer experiences. Building trust and authenticity through the analysis of customer preferences, demographics, motivations, and social interactions is crucial for successful marketing strategies. The research avenues within this category also focus on personalization and customization, examining the effectiveness and ethical implications of personalized marketing strategies in virtual environments. Additionally, cross-cultural analysis, customer retention, and word-of-mouth marketing play a significant role in shaping consumer perceptions and brand reputation.

Ethical Marketing and Social Responsibility is another important area of inquiry, as it focuses on developing responsible marketing practices that balance consumer privacy and business objectives. This includes investigating strategies for promoting environmentally

responsible consumption and production, fostering diversity and inclusion, and ensuring consumer protection and advocacy in virtual environments.

Evaluation and Performance Measurement is a critical aspects of marketing research in the metaverse. Developing reliable metrics, methodologies, and frameworks for assessing the effectiveness of marketing campaigns in virtual environments is necessary for refining marketing strategies. Furthermore, understanding the impact of metaverse marketing campaigns on consumer sentiment, brand perception, and long-term loyalty is essential for optimizing marketing efforts and ensuring sustained success.

Lastly, Technological Advances and Marketing Integration focus on the potential benefits, challenges, and limitations of utilizing artificial intelligence and machine learning in marketing campaigns. Researchers can also explore the opportunities and challenges in leveraging user data for targeted marketing and performance optimization. This area of research highlights the importance of harnessing technology to enhance marketing strategies while navigating potential pitfalls and ethical concerns.

Future research should continue to explore the long-term implications of the Metaverse, focusing on its potential impact on society, culture, and the economy. Additionally, interdisciplinary studies can contribute to a more comprehensive understanding of the Metaverse, helping to shape its development in ways that benefit individuals and communities worldwide.

4. CONCLUSION

The Metaverse represents a multifaceted and dynamic landscape that presents both opportunities and challenges for organizations, particularly within the context of marketing. This literature review has offered a critical and pragmatic examination of the extant research on the Metaverse, underscoring the significance of adopting a balanced approach when investigating its ramifications on various dimensions of marketing. By pinpointing potential constraints, biases, and areas necessitating further exploration, this review furnishes invaluable insights for organizations traversing the uncertain terrain of the Metaverse.

It is crucial, however, to approach the Metaverse with a degree of scepticism. As an emergent phenomenon, the Metaverse is subject to the *hype*, *inflated expectations*, and *potential disappointments*. Researchers and practitioners alike should exercise caution when predicting the trajectory and impact of the Metaverse on marketing and consumer behaviour. Acknowledging its nascent status, the academic community should remain vigilant in scrutinizing the potential consequences and limitations of the Metaverse, avoiding the pitfalls of overgeneralization and unfounded claims.

Future research agendas ought to encompass a diverse range of subjects, including customer behaviour and engagement, ethical marketing and social responsibility, evaluation and performance measurement, and technological advances and marketing integration. Interdisciplinary investigations can contribute to a more holistic understanding of the Metaverse, facilitating its development in ways that are advantageous to individuals, communities, and businesses globally. Scholars should persist in exploring the long-term implications of the Metaverse, concentrating on its potential impact on society, culture, and the economy, while addressing possible ethical concerns and advocating responsible marketing practices.

In summary, the Metaverse is an expeditiously evolving domain that necessitates a critical and pragmatic approach to comprehending its implications on marketing and organizational practices. By maintaining a balanced and sceptical perspective and prioritizing future research agendas, organizations can successfully navigate the Metaverse and capitalize on its unique

opportunities to foster innovation, expansion, and enduring success, while mitigating potential risks and unforeseen consequences.

REFERENCES

Aghayev, M., & Israfilzade, K. (2022). The Influence of Strategic Marketing Decisions on Customer Purchasing Decisions for Green Products. Organizacijų Vadyba: Sisteminiai Tyrimai, 88(1), 1–16.

Anshari, M., Syafrudin, M., Fitriyani, N. L., & Razzaq, A. (2022). Ethical Responsibility and Sustainability (ERS) Development in a Metaverse Business Model. Sustainability, 14(23), 15805.

Bowman, J. (2023). Mark Zuckerberg Doesn't Want to Talk About the Metaverse Anymore. The Motley Fool. Retrieved from: https://www.fool.com/investing/2023/02/11/mark-zuckerberg-doesnt-want-to-talk-about-the-meta/ (Accessed on March 22, 2023).

De Felice, F., De Luca, C., Di Chiara, S., & Petrillo, A. (2023). Physical and digital worlds: implications and opportunities of the metaverse. Procedia Computer Science, 217, 1744–1754.

Dwivedi, Y. K., Hughes, L., Wang, Y., Alalwan, A. A., Ahn, S. J., Balakrishnan, J., Barta, S., Belk, R. W., Buhalis, D., Dutot, V., Felix, R., Filieri, R., Flavián, C., Gustafsson, A., Hinsch, C., Hollensen, S., Jain, V., Kim, J., Krishen, A. S., Lartey1, J. O., Pandey, N., Ribeiro‐Navarrete, S., Raman, R., Rauschnabel, P. A., Sharma, A., Sigala, M., Veloutsou, C., & Wirtz, J. (2022). Metaverse marketing: How the metaverse will shape the future of consumer research and practice. Psychology & Marketing, 40(4), 750–776.

Gibson, W. (1984). Neuromancer. USA: Ace.

Golf-Papez, M., Heller, J., Hilken, T., Chylinski, M., de Ruyter, K., Keeling, D. I., & Mahr, D. (2022). Embracing falsity through the metaverse: The case of synthetic customer experiences. Business Horizons, 65(6), 739-749.

Harrison, M. (2023). The Metaverse Is Completely Falling Apart. Futurism. Retrieved from: https://futurism.com/metaverse-completely-falling-apart (Accessed on March 30, 2023)

Hollensen, S., Kotler, P., & Opresnik, M. O. (2022). Metaverse – the new marketing universe. Journal of Business Strategy, 44(3), 119-125.

Huang, M. H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. Journal of the Academy of Marketing Science, 49, 30-50.

Israfilzade, K., & Babayev, N. (2020). Millennial versus non-millennial users: context of customer engagement levels on instagram stories (extended version). Journal of Life Economics, 7(2), 135–150.

Israfilzade, K. (2021). Conversational marketing as a framework for interaction with the customer: Development & validation of the conversational agent's usage scale. Journal of Life Economics, 8(4), 533–546.

Israfilzade, K. (2022). Marketing in the Metaverse: A Sceptical Viewpoint of Opportunities and Future Research Directions. The Eurasia Proceedings of Educational and Social Sciences, 24, 53–60.

Jungherr, A., & Schlarb, D. B. (2022). The Extended Reach of Game Engine Companies: How Companies Like Epic Games and Unity Technologies Provide Platforms for Extended Reality Applications and the Metaverse. Social Media and Society, 8(2), 20563051221107641.

Kock, N. (2008). E-collaboration and e-commerce in virtual worlds: The potential of Second Life and World of Warcraft. International Journal of e-Collaboration (IJeC), 4(3), 1-13.

Li, Z. (2022). Research on Brand Image Evaluation Method Based on Consumer Sentiment Analysis. Computational Intelligence and Neuroscience, 2647515.

Lim, W. M. (2023). Transformative marketing in the new normal: A novel practice-scholarly integrative review of business-to-business marketing mix challenges, opportunities, and solutions. Journal of Business Research, 160, 113638.

MacDonald, K. (2022). I've seen the metaverse – and I don't want it. The Guardian. Retrieved from: https://www.theguardian.com/games/2022/jan/25/ive-seen-the-metaverse-and-i-dont-want-it (Accessed on March 30, 2023)

Mittal, G., & Bansal, R. (2023). Driving Force Behind Consumer Brand Engagement: The Metaverse. In Cultural Marketing and Metaverse for Consumer Engagement. 164-181. IGI Global.

Ramadan, Z. (2023). Marketing in the metaverse era: toward an integrative channel approach. Virtual Reality, 1-14.

Rathore, B. (2023). Digital Transformation 4.0: Integration of Artificial Intelligence & Metaverse in Marketing. Eduzone: International Peer Reviewed/Refereed Multidisciplinary Journal, 12(1), 42-48.

Robertson, H. (2021). Wall Street is pumped about the metaverse. But critics say it's massively overhyped and will be a regulatory minefield. Markets Insider. Retrieved from: https://markets.businessinsider.com/news/stocks/metaverse-outlook-overhyped-regulations-facebook-meta-virtual-worlds-genz-2021-12 (Accessed on March 29, 2023).

Rodriguez, S. (2021). Facebook changes company name to Meta. CNBC. Retrieved from https://www.cnbc.com/2021/10/28/facebook-changes-company-name-to-meta.html (Accessed on April 17, 2022)

Stephenson, N. (1992). Snow Crash. USA: Spectra.

Tsai, S. (2022). Investigating metaverse marketing for travel and tourism. Journal of Vacation Marketing, 1-10. https://doi.org/10.1177/13567667221145715.

Valaskova, K., Machova, V., & Lewis, E. (2022). Virtual Marketplace Dynamics Data, Spatial Analytics, and Customer Engagement Tools in a Real-Time Interoperable Decentralized Metaverse. Linguistic and Philosophical Investigations, 21, 105-120.

Wankhede, C. (2022). What is the metaverse and why is it so controversial? Android Authority. Retrieved from: https://www.androidauthority.com/what-is-the-metaverse-3107774/ (Accessed on April 20, 2022).

Zhang, L., Anjum, M. A., & Wang, Y. (2023). The Impact of Trust-Building Mechanisms on Purchase Intention towards Metaverse Shopping: The Moderating Role of Age. International Journal of Human-Computer Interaction, 1–19.

Zhao, Y., Jiang, J., Chen, Y., Liu, R., Yang, Y., Xue, X., & Chen, S. (2022). Metaverse: Perspectives from graphics, interactions and visualization. Visual Informatics, 6(1), 56–67.

Volume XIX, Issue (1) (2023) 426-436

International May Conference on Strategic Management

THE INFLUENCE OF PRODUCTION PLANNING ON SERVICE QUALITY IN NIGERIAN RETAIL FIRMS

Ugwu Kelechi Enyinna[1*], Awa Stanley Kalu[1], Njoku Charles Odinakachi[1], Nnaji-Ihedinmah Nnadozie Chijioke[1], Onyeanwu Christian Chidi[2]

[1]Federal University of Technology Owerri Imo State (FUTO), Nigeria; [2]Nnamdi Azikiwe University Awka Anambra State (UNIZIK), Nigeria

Abstract: The inability to promptly forecast customers demand and meet their expectation might affect how satisfied and loyal they are. Lack of production planning influences negatively service quality. The general objective focused to examined the influence of production planning on service quality in Nigerian retail firms, Shoprite and Everyday Supermarket. The study adopted correlational survey design and questionnaire as instrument for data collection. The total population of the study comprised of 144 employees. Non-probability judgmental sampling technique was adopted in the distribution of the survey. Primary data were collected using structured questionnaire administered by the researcher via face-to-face method. The questionnaire was designed using a five points Likert scale. The data was statistically tested and analysed using Pearson Product Moment Correlation to determine the relationship between the variables. The result showed that production planning variables (aggregate planning and strategic planning) contributes positively to service quality. The researcher recommends companies to adopt the culture of continuous improvement in their production processes in order to boost customer loyalty and delight; Firms are encouraged to improve their services by transitioning from physical to electronic shopping in order to meet with customers need and satisfaction.

Keywords: Production Planning, Strategic Planning, Customer Satisfaction, Customer Loyalty, Transformational Leadership

1. INTRODUCTION

Manufacturing firms across the globe have seen the significance of integrating production planning in their facility to maintain a competitive advantage in the market. Nowadays, both manufacturing and retail firms are conscious of maintaining uninterrupted production schedules to help them allocate optimal resources suitably to meet with customers' demands. Inventory backlogs in retail firms caused by excessive output during a particular time period would be expensive to store owing to ineffective planning. In addition, retail businesses would incur hefty storage costs because of the discrepancy between what it delivers and what customers demand. Sales targets and inventory levels may be influence by a failure to swiftly estimate accurately consumer demand and match their expectations. As a result, poor production planning may result in a bullwhip effect that raises the organization's inventory level. Retail demand changes can trigger gradually more significant changes at the wholesale, distributor, and raw material supplier levels if the aforementioned issues are not resolved. The above problems necessitate

[*] *Corresponding author: kelechi.ugwu@futo.edu.ng*

this research. The study focused on the influence of production planning on service quality in retail firms, Shoprite and Everyday Supermarket in Owerri, Nigeria.

Production Planning handles the activities necessary before actual production begins, such as aggregate planning, strategic planning, material planning and capacity planning (Planet, 2021). Production planning reduces uncertainty by anticipating risk, uses historic data to study trends and forecast the future based on the information (Hitesh, 2021). It emphasizes the effective use of labor and capital in the production of goods and services to increase profitability. It helps firm to align sales and services with client expectations and demands (Slack et al., 2007).

Earlier studies have identified a link between planning and services with mix result. Prior studies by Mwita et al. (2022) using 73 state corporations in the agribusiness sub-sector in Kenya found that strategic planning contribute positively to service delivery. Another study by Elaho and Ejechi (2019) using table water in Edo State, Nigeria with a population of 527 people found that aggregate planning contributes significantly to customer satisfaction, while that of capacity utilization, demand forecasting and quality control planning do not contribute to customer satisfaction. Similar study by Van Es (2012) using Dutch Automobile Industry, Netherlands with a study population 114 respondents found that service quality contributes positively to customer satisfaction.

However, none of the previous studies explored the influence of aggregate planning, strategic planning, on service quality in selected retail firms, Shoprite and Everyday Supermarket, Imo State, Nigeria. This is the gap present study seek to fill.

2. REVIEW OF RELATED LITERATURE

2.1 The Concept of Production Planning

According to Lutkevich (2020), production planning is defined as the process of creating, designing and manufacturing a specific good or service. It aids businesses in increasing the effectiveness of their production process. Adegbuyi and Asapo (2010) summarized the significance of production planning as the capacity to meet customer demand, ensuring a consistent flow of communication across all business units involved in the production process, providing guidelines for manufacturing, ensuring the working environment is comfortable enough for the employees, ensuring the work load is distributed evenly, and finally providing supervision to minimize disruptions and failure.

2.1.1 The Concept of Aggregate Planning

Averbuch (2022) also defined aggregate planning as the process of developing an approximate schedule that details how an organization will operate over a particular period. It allows company to plan more effectively in meeting with the demands of its products or services without producing too much or too little. It is considered an important tool in matching production demand with production capacity in order to minimize operating costs. It specifies the right materials and right quantity to procure with available resources.

2.1.1.1 The Concept of Strategic Planning

Strategic planning is defined as a systematic process for envisioning a desired future, translating that vision into broad goals or objectives, and then developing a plan of action to achieve those goals (Schmidt et al., 2009; Andrews et al., 2017). Strategic planning, as opposed

to long-term planning, starts with the existing condition and plots a course to satisfy expected future demands. It enables businesses to plan the use and application of their resources, skills, and experience in order to achieve their organizational missions, goals, and objectives in constantly changing circumstances. Strategic planning makes an organization more flexible, equipped, and aware of market and external conditions, making it simpler for it to flex or even significantly alter its strategic goals and operational plans at the local and higher levels when fundamental, occasionally structural, developments in the economy, world affairs and society. Richardson (2006) contends strategic planning is a key discipline and a necessary, deliberate, ongoing process in order for enterprises to plan the use and application of resources, skills, and knowledge to fulfil their missions and objectives in an uncertain environment. It is a management technique that aids organizations in identifying their long-term goals and a method for creating a thorough road map for creating a solid, convincing, and successful corporation.

2.1.1.1.1 The Concept of Service Quality

Consumer happiness is characterized by an evaluation of whether the services provided meet the expectations of the clients (Kyoon & Ah Park, 2007). Better products or services frequently have an impact on consumers' decisions and preferences to purchase more of that thing. This suggests that providing clients with high-quality service may encourage them to spend more money than they had originally intended. This suggests that customer consumption will increase in direct proportion to service quality innovation. Consequently, clients' ability to buy a particular goods in the market will increase. Yarimoglu (2014) contends that higher quality results in happier and more devoted customers. The reason is that satisfied clients are more likely to use your services again than dissatisfied ones. The majority of businesses, particularly financial technology companies, have grasped how important service quality is to long-term competitive advantage. Customer happiness and service quality are crucial for the growth, development, and competition of businesses in the market (Angelova & Zekiri, 2011).

2.2 Theoretical Framework

This study is anchored on Transformational Leadership (TL) propounded by James Mac-Gregor Burns in 1978 while studying political leaders. Transformational leadership theory describes leadership that collaborates with subordinates to identify essential changes, carry out contingencies measure to improve organizational effectiveness (Garden, 2010; Ellen, 2016). The transformation leadership theory is a management approach that instructs, inspires, and motivates staff to produce exceptional results (Odumeru & Ogbonna, 2013). The core idea of this theory focused on strong motivational impact that leaders used to influence subordinates to achieve on organizational goal. It also describes how a leader collaborates with subordinates to identify essential changes, create and guide visions through influence, and carry out contingencies. TL is connected to the current study on production planning and service quality in retail firms, Nigeria. The explanation of the theory explain how production planning can improve service quality, which in turn increases customer happiness and loyalty.

2.3 Empirical Review

Numerous scholars have carried out on Production Planning and Service Quality in both Nigeria and the rest of the world with mix result. Some of the studies were reviewed below. Arokiasamy and Abdullah (2013) examined the Effect of Service Quality Dimensions on Customer Satisfaction in Malaysia. Primary data were collected from a total population of 225

Cellular Telecommunication Service Providers. Gap analysis was used to determine the perceived and expected satisfaction level on each of the service quality dimensions. The hypotheses were tested statistically using regression method to generate study result. Findings showed that all the five service quality dimensions (loyalty and attitude) exerts positive influence on customer satisfaction.

Ugwu, et al. (2022) evaluated the influence of contingency planning on organizational performance during coviq 19 pandemic in Hospitality Industry, Imo State, Nigeria. The total population comprised of 295 employees using nine selected hotels. Sample size was calculated statistically using Taro Yamane formula and given as 170. The hypothesis was tested and analyzed using Pearson Correlation to generate result. Findings revealed that contingency planning variable (tactical planning) contribute positively to organizational performance variable (organizational flexibility).

Naik et al. (2010) examined the Influenced of Service Quality on Customer Satisfaction in Retail firms in India. Data were gathered from a total population of 360 people. Out of questionnaire administered only 245 were filled and returned, while the remaining 124 were not filled and used for the study. Findings revealed that service quality has positively influenced customer satisfaction.

Pakurar et al. (2019) examined the Effect of Service Quality Dimensions on Customer Satisfaction in the Jordanian Banking Sector. Service quality (SERVQUAL) model was adopted to determine the influence on the dependent on independent variables. Primary data were collected from 825 customers. The hypotheses were tested and analysed statistically using exploratory factor analysis with the aid of Statistical Package on Social Sciences (SPSS) to generate the result. Findings showed that service quality dimension has a positive influence on customer satisfaction.

Tooraj and Sahel (2011) looked at the Relationship between Product Planning and Customer Satisfaction in Iran. The target population comprised of customers of manufactured products of Samsung factory in Mashhad. Cluster sampling Technique was used in the distribution of the survey from a population of 100 people. Descriptive statistics was used to test the hypothesis. Findings revealed that product design had a positive significant relationship with expected value.

Wijetunge and Pushpakumari (2014) investigated the Relationship between Strategic Planning and Business Performance using an Empirical Study of Manufacturing Small and Medium Enterprise in Western Province in Sri Lanka. Data were collected through structured questionnaire distributed among 275 owners/managers of SMEs in Western province. Both descriptive and inferential statistics technique were used analysed data. Findings revealed that SMEs are moderately engaged in strategic planning process and there is positive relationship between strategic planning and business performance.

Koko and Zuru (2019) examined the Strategic Planning and Performance of Enterprises in Sokoto. The study population comprised of managing director/chief executive officer, general manager and senior manager of the enterprise. The research utilized a descriptive survey and questionnaire as instrument for data collection. The total population of the study comprised of 80 people. Out of 80 questionnaires sent to the participants, only 52 were returned and used for the study while the remaining 28 were not utilized for the study. The study used least squares structural modelling (SEM) to analyse. The data collected as well as to test the hypothesis of the study. The result showed a significant positive relationship between strategic planning practice and performance of enterprises.

Ehigie and Jesse (2018) studied the Impact of Service Quality on Customer Satisfaction using Liberian Revenue Authority. Inductive qualitative research method and interview via emails and skype. The study population comprised of 14 respondents such as business directors

and executives of 11 corporate tax payers in Gavle. Judgmental sampling techniques was adopted in collection of raw data. Content analysis was used to analyse primary data, a comparison of raw data (findings) and theory was made to make decision. The findings revealed that service quality variables (responsiveness, empathy and assurance) had significant influence on customer satisfaction. The findings also showed that digitalization of taxation services had significant influence on taxpayers' ability to pay on time and consistently.

Yazan (2018) investigated the Strategic Flexibility and its Impact on Enhancing Organizational Effectiveness using Jordanian Hotels. The study adopted a descriptive research technique in which the total population of the study was 15 Hotels and approximately 150 workers who were administered questionnaires and completely returned. Data collected from this sample were subjected to multiple linear regression analysis to test the hypothesis. Findings showed that strategic flexibility and its dimensions (market flexibility, production flexibility and competitive flexibility) have a significant positive influence on organization effectiveness in the Jordanian hotels. In light of the above, none of earlier studies examined the influence of aggregate planning and strategic planning on service quality in retail firms, Shoprite and Everyday Supermarket in Imo State, Nigeria. This is the gap present study seek to fill.

3. RESEARCH METHODOLOGY

3.1 Research Design

The study used correlational survey design to examine the influence of production planning on service quality in retail firm. The study population involves the Chief Executive Officer, Managers, Supervisors and Unit Head of Departments of selected retail firms, ShopRite and Everyday Supermarket in Owerri, Nigeria.

3.1.1 Sample Size and Sampling Technique

The sample size was determined using the Taro Yamane (1973) sampling method.
It is indicated by the following formula:

$$n = N/1 + Ne^2 \quad (1)$$

where n = sample size; N = Population Size; e = Sampling Error = 0.05
$n = 225/1 + 225\ (0.05)^2$
$n = 225/1 + 0.5625 = 144.$

Bowler (1926) proportional allocation method formula was utilized in the distribution of the questionnaire to the two (2) selected retail firms. The Bowlers proportional allocation formula is stated below as follows:

$$nh = \frac{nNh}{N} \quad (2)$$

Where nh = Bowley's allocation formula
Nh =Number of items in each stratum in the population.
n = Sample size
N = Population size

By applying the formula, we have:

Shoprite Firm = $\frac{144\ (117)}{225}$ = 74.88 = 75

Everyday Supermarket Firm = $\frac{144\ (108)}{225}$ = 69.12 = 69

Table 1. Population and Questionnaire Response Rate

S/N	Retail Firms	Population	Copies Distributed	Copies filled and returned	Percentage Returned
1	Shoprite	117	75	70	53.03
2	Everyday Supermarket	108	69	62	46.97
	Total	225	144	132	100

Source: (Field Survey, 2022).

The study adopted non-probability judgmental sampling technique in the distribution of the survey. The reason for choosing this method is to allow the researcher to use intuition to make decision during process of administration survey to the participants.

3.1.1.1 Method of Data Collection

The questionnaire was self-designed, vetted and validated by an expert in the field of management for consideration. It was ascertained in such a way that it was formed in simple language for easy understanding, derived from the literature to ensure they capture the concept and content of the research objectives. Reliability of the instrument were ascertained with the aid of Cronbach alpha test and the value was given as .966. To guarantee consistency of result, a pilot test was conducted using few questionnaires to check the effectiveness of the instrument. A comparison of result generated from the pilot test with the main study showed that the instrument of the study was reliable. Pearson Product Moment Correlation was used in testing the stated hypothesis.

3.1.1.1.1 Model Specification

Production planning was proxy to aggregate and strategic planning. In linear regression, the model specified below describes the relationship between the production planning (independent) and service quality (dependent variable). The model equation is stated below;

$$Y= \beta_0 +\beta_1 X_1+\beta_2X_2+ \beta_3 X_3 + e \quad (3)$$

Where; X is a function of, X_1, X_2, X_n representing independent variables (aggregate planning and strategic planning), and B_1, B_2… B_n are the coefficients of the regression equation.

Y= Service quality (Y_1); β_0 = parameter constant; e= Error term.

4. RESULT AND DISCUSSION OF FINDINGS

4.1 Presentation of Result

This study focused on the influence of production planning on service quality using retail firms, Imo State, Nigeria. The primary data were collected and presentation in the order of the research questions. Data were collected, tabulated and analysed using IBM Statistical Package on Social Science (SPSS Version 20). Out of 144 copies of questionnaire distributed to the

respondents, only 132 were filled and returned, while the remaining 12 were not returned and used for the analysis.

4.1.1 Analysis of Research Hypothesis

Aggregate planning and strategic planning contribute significantly to service quality. Table 2 below shows participant response on research question one using five-point likert scales. Instruction: Please tick (✓) a response according to your own opinion using; strongly agree (SA=5), agree (AG=4), undecided (UN=3), disagree (DA=2) and strongly disagrees (SD=1).

Table 2. Investigative Questions on Production Planning and Service Quality

S/N	Test Questions	SA	AG	UN	DA	SD	Total
A	Production Planning						
	Aggregate Planning						
1.	We process customers order and deliver to their door step on time.	63	61	2	2	4	132
2.	We enhance productivity through waste reduction and resource utilization.	60	65	1	4	2	132
3.	Often times, we maintain flexibility to accommodate client's demand.	59	65	2	3	3	132
4.	Our architectural design and geographic location are second to none.	56	67	5	1	3	132
5.	We utilize our resources efficiently to reduce operation cost for the organization.	60	61	7	3	1	132
6.	We provide regular schedules for services and commodities to enable customers place their order.	53	68	3	2	6	132
7.	Most times, we evaluate our performance and seek new ways of doing things.	62	64	1	3	2	132
B.	Strategic Planning						
8.	Our business has clear vision and mission.	99	31	0	1	1	132
9.	Our business model focus on meeting the present and future needs of the customers.	87	38	1	4	2	132
10.	Often times, we maintain flexibility to accommodate client's demand.	78	40	9	3	2	132
11.	Everyone works together to achieve collective goals.	72	58	1	1	0	132
12.	We appraise performance of staff regularly and communicate to them appropriately.	63	61	1	6	1	132
13.	Our staff have positive attitude towards their job and organization.	66	52	7	3	4	132
14.	Most times, we evaluate our performance and seek new ways of doing things.	67	57	3	3	2	132
C.	Service Quality						
15.	We improve our services regularly to meet customer's demand.	64	62	2	3	1	132
16.	Our client's rate our services high compared to rivals.	69	56	4	2	1	132
17.	We adjust our activities in order to meet with market conditions.	60	67	1	3	2	132
18.	The value we create to our customers contribute to our business performance.	61	59	7	3	2	132
19.	Often times, we manage customer complaints and provide timely solutions to them.	64	60	6	1	1	132
20.	We strive to provide high quality services to our customers.	68	60	1	1	2	132
21.	We have improved on our non-competencies in order to be the leader in the hospitality industry.	65	62	3	0	2	132

Source: (SPSS Version 20).

4.2 Test of Research Hypothesis

H_{A1}: Aggregate planning and strategic planning contribute significantly to service quality.

Reject the null hypothesis (H_0) when p-value is ≤ 0.05; otherwise accept the alternate (H_A) hypothesis. Since the p-value (.000) is less than the critical value (0.05), the alternate hypothesis which states that aggregate planning and strategic planning contribute to service quality was accepted; while the null hypothesis which states that aggregate planning and strategic planning do not contribute to service quality was therefore rejected. The result indicates that the relationship is statistically significant between the variables.

4.2.1 Decision Rule

Reject the null hypothesis (H_0) when p-value is ≤ 0.05; otherwise accept the alternate (H_A) hypothesis. Since the p-value (.000) is less than the critical value (0.05), the alternate hypothesis which states that aggregate planning and strategic planning contribute to service quality was accepted; while the null hypothesis which states that aggregate planning and strategic planning do not contribute to service quality was therefore rejected. The result indicates that the relationship is statistically significant between the variables.

Table 3. Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.992[a]	.985	.984	3.85056

Table 4. Analysis of Variance (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	30364.113	2	15182.056	1023.958	.000[b]
Residual	474.459	32	14.827		
Total	30838.571	34			
Regression	30364.113	2	15182.056	1023.958	.000[b]
Residual	474.459	32	14.827		
Total	30838.571	34			
Regression	30364.113	2	15182.056	1023.958	.000[b]
Residual	474.459	32	14.827		
Total	30838.571	34			

a. Dependent Variable: SQ
b. Predictors: (Constant), SP, AP b. Predictors: (Constant), SP, AP

Table 5. Linear Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.390	.881		-.443	.661
	AP	.842	.055	.822	15.182	.000
	SP	.174	.051	.184	3.394	.002

Source: (SPSS Version 20)

a. Dependent Variable: SQ

$$Y= \beta_0 +\beta_1 X_1+\beta_2 X_2+ \beta_n X_n + e \quad (4)$$

The regression analysis can thus be restated as follows:

$$SQ = -3.90 + 0.822 (AP) + 0.184 (SP) \quad (5)$$

4.3 Discussion of Findings

The hypothesis was tested using linear regression method which produced model summary and analysis of variance above. It was on the basis of the statistical significance of the regression coefficient that the hypothesis test results were interpreted. The findings were shown in table 3, 4 and 5 respectively. The result in table 3 showed a correlation value (R) of .992 which depicts that there is a strong linear dependency between the variables strategic planning, aggregate planning and service quality. An adjusted R squared value of 0.984 was further established indicating that aggregate planning and strategic planning explains 98.4% changes in service quality, while the remaining 1.5% is explained for by other factors not captured in the present regression model. The ANOVA test result in table 4 above were performed at 95 % confidence level to show the models goodness of fit. The result further showed that the model predicting the influence of strategic planning and aggregate planning on service quality was significant ($F= 1023.958$, $p <0.05$). The result further reveal that strategic planning and aggregate planning had a significant positive influence on service quality. The null hypothesis was rejected, while alternate hypothesis was accepted.

5. FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The summary of the finding is presented below.

Findings of research objective confirmed that both aggregate planning and strategic planning are statistically significant.

5.1.1 Conclusion

This study examined the influence of production planning on service quality in retail firms Shoprite and Everyday Supermarket in Imo State, Nigeria. The result established that production planning variables (aggregate planning and strategic planning) contributes positively to service quality. This result revealed that changes in the production planning improves aggregate and production planning which in turn increases service quality of retail firms. This result is in agreement with findings of Wijetunge and Pushpakumari (2014) which indicate that strategic planning had a positive influence on business performance. The findings is in agreement with studies of Koko and Zuru (2019) which confirmed that strategic planning practice had a significant positive influence on performance of enterprises.

5.1.1.1 Recommendations

Based on findings above, the following recommendations were made to guide this study.

I. Companies are advised to adopt the culture of continuous improvement in their production processes in order to boost customer loyalty and delight.
II. Firms are encouraged to improve their services by transitioning from physical to electronic shopping in order to meet with customers need and satisfaction.

III. Retail firms are advised to regularly change their business models in order to meet with the present and future needs of the customers
IV. Organizations are advised to communicate to employees their visions and mission to enable them achieve organizational goals.

5.2 Future Research

Future researchers are advised to look at the relationship between service quality and customer satisfaction. The scope of this study is limited to retails firms in Imo State. Future study should explore other industries such as telecommunications, banks and tertiary institutions in order to replicate study and achieve generalization.

5.3 Practical Implications of the Study

It can be deducted from the findings that production planning is a significant for improved service quality among retail firms. This research would be beneficial not only to retail firms but also similar industries especially those faced with challenges of production planning in their units or departments. This would lead to improvement in service delivery and maximization of resources to create customer delight and improve productivity. The study would guide future researchers to identify problems from different perspective in order to replicate study.

REFERENCES

Adegbuyi, P. A. O., & Asapo, E. S. (2010). The Effect of Production Planning and Budgeting on Organizational Productivity. Leonardo Electronic Journal of Practices and Technologies, 16, 201-217.

Andrews, R., Beynon, M. J., & Genc, E. (2017). Strategy Implementation Style and Public Service Effectiveness, Efficiency and Equity. Administrative Science, 7 (4), 1-19.

Angelova, B., & Zekiri, J. (2011). Measuring Customer Satisfaction with Service Quality Using the American Customer Satisfaction Model (ACSI Model). International Journal of Academic Research, Business and Social Science, 1, (3), 232-258.

Averbuch, Z. (2022). Aggregate Planning and its effect on fluctuating needs. White Paper. Retrieved Online on 21/04/2023 from: https://monday.com/blog/project-management/aggregate-planning/

Bowley, A. L. (1926). Measurements of precision attained in sampling. Bull. Int. Stat. Inst., Amsterdam, 22, 1-62.

Ehigie, C. J., & Jesse, S. K. (2018). Impact of Service Quality on Customer Satisfaction using Liberian Revenue Authority. Master's Thesis, Department of Business Administration. Liberia: University of Gavle.

Elaho, B., & Ejechi, J. (2019). Production Planning and Customer Satisfaction in Table Water Companies in Edo State, Nigeria. European Journal of Business and Management, 11 (17), 71-82.

Garden, M. (2010). Transformation Leadership. Available Online. Retrieved on 26/08/2022 from https://www.smu.edu/-/media/Site/Cox/Executive-Education/PDF/White-Papers/Mind-Garden-White-Paper--TransformationalLeadership.pdf?la=en

Hitesh, B. (2021). Corporate Planning Definition- Strategy, Importance, Objectives and Elements. Retrieved from www.marketing91.com

Kyoon, Y, D., & Ah Park, J. (2007). Perceived service quality: Analyzing relationships among employees, customers, and financial performance. International Journal of Quality and Reliability Management, 24 (9), 908-926. https://doi.org/10.1108/02656710710826180

Kim, T., Kim, W. G., & Kim, H. B. (2009). The effects of perceived justice on recovery satisfaction, trust, word-of-mouth, and revisit intention in upscale hotels. Tourism Management, 30, 51–62.

Koko, M. A., & Zuru, N. L. (2019). Strategic Planning and Performance of Enterprises in Nigeria. International Journal of Research and Innovation in Social Science (IJRISS), 3 (10), 417-420.

Lutkevich, B. (2020). Definition of Production Planning. Retrieved Online on 26/08/2022 from https://www.techtarget.com/searcherp/definition/production-planning

Mwita, B. K., Awino, Z., Ogutu, M., & Njeru, W. (2022). The Nexus Between Strategic Planning and Service Delivery Among Agribusiness State Corporations in Kenya. European Journal of Business and Management Research, 7 (4), 362-366.

Naik, C.N.K., & Gantasala, V. P. (2010). Service Quality and its Effects on Customer Satisfaction in Retailing Introduction-Measures of Service Quality. European Journal of Social Sciences, 16 (2), 239-251.

Odumeru, J. A., & Ogbonna, I. G. (2013). Transformational vs Transactional Leadership Theory: Evidence in literature, Nigeria. International Journal Review of Management and business Research, 2 (1), 355.

Pakurar, M., Haddad, H., Nagy, J., Popp, J., & Olah, J. (2019). Service Quality Dimensions that Affect Customer Satisfaction in the Jordanian Banking Sector. Journal of Sustainability, 11, 1-24.

Richardson, K. (2006). The financial times guide to strategy, FT Prentice Hall (3rd ed.).

Schmidt, J. C., Enock, K., Laycock, M., & Beynon, C. (2017). Understanding the Theory and Process of Strategy Development: Theories of Strategic Planning. Available Online. Retrieved on 22/04/2023 from https://www.healthknowledge.org.uk/public-health-textbook/organisation-management/5d-theory-process-strategy-development/strategic-planning

Slack, N., Chambers, S., & Johnston, R. (2007). Operations Management. England: Pearson Education Limited.

Spacey, J. (2019). Examples of Operational Planning. Retrieved Online on 26/08/2022 from https://simplicable.com/new/operations-planning

Tooraj, S., & Sahel, F. (2011). The Role of Customer Satisfaction in Product Planning. Middle-East Journal of Scientific Research, 7 (1), 39-45.

Ugwu, K. E., Kekeocha, M., Nnaji-IhedinmahEb N. C., & Ebomuche, N. N. (2022). Contingency planning on organizational performance during coviq 19 pandemic. Innovations, 69 (6), 958-968.

Van Es, R. A. J. (2012). The Relationship between service quality and customer loyalty, and its influence on business model design: A study in the Dutch Automotive Industry, Netherlands. Master's Thesis, University of Twente.

Wijetunge, W. A. D., & Pushpakumari, M. D. (2014). The Relationship Between Strategic Planning and Business Performance: An Empirical Study of Manufacturing SMEs in Western Province in Sri Lanka. The Kelaniya Journal of Management, 3 (1), 23-41.

Yarimoglu, E. K. A. (2014). A Review on Dimensions of Service Quality Models. Journal of Marketing Management, 2, 79-93.

Yazan, E. A. (2018). Strategic Flexibility and its Impact on Enhancing Organizational Effectiveness: An Applied Study on Jordanian Hotels. International Business Research Archives, 11 (10), 165-173.

Volume XIX, Issue (1) (2023) 437-446

International May Conference on Strategic Management

IMPROVING REVENUE COLLECTION EFFICIENCY THROUGH TAX AUTOMATION IN NIGERIA

Oyewobi Ifeoluwapo A.[1], Beida Philip Ozovehe[2*]

[1]Bingham University Karu; [2]Federal Inland Revenue Service, Abuja; Nigeria

Abstract: This study considers the effect of automation in collecting taxes on economic growth in Nigeria. The Federal Inland Revenue Service in 2017 commenced the adoption of ICT in the assessment, collection and accounting of taxes. The Adoption of VATrac and ISDLS for instance has seen an improvement in the collection of VAT and Stamp duty over the years. The study seeks to empirically validate the effect of the tax automation on improving the collection of taxes vis a vis its effect on the country's economic growth. Data for VAT and Stamp duty collection were regressed using the ordinary least square corrected by the Vector Error Correction Model. The findings revealed a long run and a short-run relationship that these taxes had on gross domestic product, a proxy for economic growth. However, this relationship is only significant in the short run. Tax administrators are therefore encouraged to invest in the deployment of technology. They are, however, encouraged to consider other factors like governance, Value for money and return on investment and competency in adopting technology.

Keywords: Automation, Federal Inland Revenue Service, Stamp Duty, Value added Tax

1. INTRODUCTION

The Federal Inland Revenue Service (FIRS) in the year 2022 collected a total of N10.1 trillion (21.9 Billion in dollars) in both oil and non-oil revenues. Nigeria runs a fiscal federation for which the three tiers of government are uniquely responsible for the administration and collection of their taxes. The Federal Inland Revenue Service is the government agency responsible for collecting Federal Taxes in Nigeria, mainly company taxes. The collection result is significant in so many ways. First, this is the only time the FIRS is crossing the 10 Trillion Naira threshold and coming close to its 10.44 Trillion Naira Target set by the government. Secondly, The FIRS collection in 2022 is 57.8% above its collection in 2021. Its collection is in 2021 stood at 6.40 Trillion naira. Thirdly and most important, is the Impact of its automation and digital innovation in the assessment and collection of taxes. This, according to the FIRS, started during the commencement of its current Management in 2020 (Premium Times, 2023).

Providing perspective to this unprecedented tax collection, the FIRS noted in the Performance Update that the Management came up with a four-point focus, namely: administrative and operational restructuring; making the service customer-focused; creating a data-centric institution; and automation of administrative and operational processes (Premium Times, 2023). It is a general notion that to eliminate human intervention in any business process, it is best to automate it. Indeed, in 2017, the FIRS made its first attempt to integrate automation

* *Corresponding author: philipbeida@gmail.com*

into the collection of Stamp Duty and Value Added Tax (both indirect taxes). Initial statistics have shown that automating the Stamp duty and VAT collection has significantly improved its collection. Economic growth is a function of several factors. Factors likely to affect economic growth include human resources, natural resources, capital formation, technological development, and social and political factors (Olurankinse & Oladeji, 2018). Tax is generally opined to be a contribution to Economic growth. This study sought to provide empirical evidence of the effect of tax collection via tax automation on its Gross Domestic Product (GDP) relying on the FIRS collection. The study attempted to connect the significance level and its impact on implementation by considering the relationship between identified variables.

2. LITERATURE REVIEW

2.1. Conceptual Framework

2.1.1. Tax Automation in Nigeria

The adoption of Information and Communication Technology (ICT) is defined as a collective term for a wide range of software, hardware, telecommunications and information management techniques, applications and devices, that are used to create, produce, analyse, process, package, distribute, receive, retrieve, store, and transform information (Brady et al., 2008). Automation involves the use of control systems and information technologies to lessen the necessity for human work in the production of goods and services Likewise, tax automation bridges the gap between tax officials and taxpayers by minimising the scope for negotiation in tax registration, filing and payments, Thus, a vital strategy for realising efficiency in tax administration (Irefe-Esema & Akinmade, 2020).

Information and Communication Technology is used to enhance performance in revenue administrations by reducing human error and processing times, providing readily accessible data for tax officers and promoting voluntary compliance thereby minimising tax evasion and facilitating better decision-making by tax authorities (Efunboade, 2014). E-Taxation may include; E-Registration, E-Stamp Duty, E-Tax Payment, E-Receipt, E-Filling: and Electronic Tax Return Certificates (E-TCC) (Nwamgbebu et al., 2021). E-taxation emerged in the 1980s, within the wider concept of tax automation, to facilitate tax refunds and was first adopted by the Internal Revenue Service (IRS) in the United States of America (USA) (Irefe-Esema & Akinmade, 2020). The FIRS first introduced electronic taxation in 2015 through E-payment solutions and in alliance with the Nigerian Inter-Bank Settlement System (Irefe-Esema & Akinmade, 2020). The FIRS has over the years, automated some of its other tax processes which include electronic processes and tailored made projects to address specified areas of the tax system.

2.1.2. VATrac (VAT Automation System)

Value Added Tax was first introduced in Nigeria in 1993 to replace the sales taxes operating in some parts of the country especially the western states in Nigeria. The objective of introducing Value Added Tax there to asides from replacing the sales Tax was to harmonize the collection of indirect Taxes across the entire country. VAT is a consumption tax paid when goods are purchased and services rendered. It is a multi-stage tax borne by the final consumer. All goods and services (produced within or imported into the country) are taxable except those specifically exempted by the VAT Act. It is charged at a rate of 7.5%. Some goods and services such as non-oil exports are zero rated. All taxable persons are required to file VAT monthly

returns not later than 21st day following the month of transaction (FIRS, 2022). A general economic idea is that if sales taxes are high enough, people start engaging in widespread tax evading activity. On the other hand, total VAT rates can rise above 5% without widespread evasion because of the novel collection mechanism (Abdulrazaq, 2012).

In a public notice, the FIRS introduced the automated VAT collection system. This they said was to ensure an efficient and seamless collection of the remittance of VAT on all vat able transactions in the wholesale/retail sector and enable direct/reconciliation of all VAT transactions. The effective date of operation of the Automated VAT Platform ("VATrac") was Wednesday, 1st April 2020. The VATrac thus, become the approved channel for VAT returns filing and payment processing. Businesses in the above categories are therefore mandated to ensure compliance and prompt connectivity with the VATrac. Accordingly, the affected businesses are to liaise with The FIRS, in their circular, noted that the introduction of the VATrac was to aid the ease of doing business in Nigeria and would not disrupt the daily operations and existing systems of affected businesses, given that the VATrac was initiated to operate side-by-side with any standard Point of Sales (POS)/ fiscal machine. (FIRS, 2022). The introduction of VATrac demonstrates the FIRS' commitment to leverage technology to improve tax administration in Nigeria. It is anticipated that the use of technology to enforce VAT compliance would ultimately result in increased tax revenue by minimizing leakages, widening the tax net and reducing the cost of administration (KPMG, 2020).

2.1.3. Integrated Stamp Duty Portal (ISDLS)

Stamp duty is a government levy (indirect tax) that is charged on written or electronic transaction documents. Stamp duty is levied on written or electronic transaction documents (Ekpenyong et al., 2021). The tax is governed by the Stamp Duty Act (SDA) of 1939 and charged as a flat rate or percentage of the transaction/instrument value, taking the nature of the instrument into cognizance. The FIRS assesses and collects duty on documents executed between a company and an individual, group or body of individuals while the FCT and States Internal Revenue Service (IRS) assess and collect duty on documents executed between persons or individuals (FIRS, 2022). Fixed Duty is duty that does not vary with consideration, e.g. duty on payment receipt, proxy forms, guarantor forms, etc. Ad-valorem is Duty that vary with consideration, e.g. duty on Share Capital, Deed of Assignment, Debenture, Bills of Exchange. Duties are paid before documents are executed (FIRS, 2022). Section 52 of the Finance Act, 2019 amended Section 2 of the Stamp Duty Act, 2004 to extend the meaning of "stamp" to include "an electronic stamp or electronic acknowledgment" for denoting any duty or fee. The provision extended the meaning of "stamped" to include "instruments and materially tagged with electronic stamp or national stamp on an electronic receipt". The meaning of "instruments" is extended to "electronic documents (Ekpenyong et al., 2021).

Similarly, Section 54 of the Finance Act, 2019 amended Section 89 (1) of the Stamp Duty Act, 2004 to include "electronic inscription whereby any money" is paid within the meaning of "receipt" for the purpose of stamp duty payment. Section 89 (2) is introduced to provide for "digital tag with electronic stamp or any acknowledgement of duty charged on an electronic transaction". (Ekpenyong et al., 2021). The FIRS introduced the Integrated Stamp duty Portal in 2017 but effective collection of stamp duty became effective after the signing of the Finance Act 2019. The ISDL integrates all stakeholders; Individual and Companies, including ministries, departments and agencies provides a profile for designated FIRS technical representatives to manage Integrated Stamp Duty Services processes, which include user account management (creation, account reset, deactivation) based on access roles, MDA Profile creation, Stamp Duty Instrument Management (including creation, updates/amendments,

deactivation), view details of corporate and individual taxpayers information as provided on the system and generate reports for reconciliation (FIRS, 2022).

2.1.4. Economic Growth

Economic growth in a country is the measure of its Gross Domestic Product. It is simply an increase in the number of goods and services produced in a country measured over time adjusted for inflation. Van defined economic growth as a sustained increase in the net real national product (or income) per inhabitant (Van, 2013). According to him, as a general practice, economic growth is not measured against production capacity, as it is very difficult to estimate. Rather, it is measured against national production. He also defined economic growth as 'a sustained increase in the net real national product (or income) per inhabitant.' John Fleming (1970), in his Report of a Conference at Ditchley Park, discussed factors likely to affect economic growth are; Human resources, Natural Resources, Capital Formation, Technological Development, and Social and Political Factors. In a series of research papers, Associate Professor Diego A. Comin and colleagues investigated the relationship between technology adoption and per capita income. They found that the rate at which nations adopted new tools hundreds of years ago strongly affects whether those nations are rich or poor today (Nobel, 2012). Economic growth is typically measured using Gross Domestic Product (GDP). GDP is the total value of everything produced in the country, including goods and services, (Yashim, 2022).

2.2. Theoretical Framework

2.2.1. Neoclassical Growth Theory

Robert Solow and Trevor Swan have the credit of developing and introducing the model of long-run economic growth in 1956. Neoclassical growth theory is an economic theory which helps to demonstrate how a steady economic growth rate can result from a combination of three driving factors i.e., labour, capital, and technology. The model first considered exogenous population increases to set the growth rate but, in 1957, Solow incorporated technology change into the mode. The theory stipulates that technological change has a major influence on an economy, and economic growth cannot continue without technological advances. (Boyle, 2019). The production function of neoclassical growth theory is used to measure the growth and equilibrium of an economy. That function is Y = AF (K, L). (Boyle, 2019); Y denotes an economy's gross domestic product (GDP), K represents its share of capital, L describes the amount of unskilled labour in an economy, A represents a determinant level of technology

In Nigeria, the deployment of technology in several business processes is increasingly becoming the norm rather than the exception and tax administrators are queuing to take advantage of this. This study is theoretically underpinned by the neoclassical growth theory.

2.3. Empirical Review

Beida (2022) in a study considered the impact of deploying ICT Tax infrastructure in the collection of indirect Taxes on economic growth in Data for VAT and Stamp duties collection were regressed pre and post-adoption using the ordinary least square. Only VAT collection had a significant impact on gross domestic product post-adoption. The study encouraged Tax administrators to invest in the deployment of technology. They are, encouraged however to

consider other factors like governance, Value for money and return on investment and competency in adopting technology.

Fabian & David (2021) in a study to determine the relationship between TaxPro-Max and FIRS tax remittance, proxied TaxPro-Max using online taxes and online returns filing. The study adopted a Survey Design and data were collected using questionnaire survey administered to the staff of Federal Inland Revenue Service (FIRS). Using Friedman's ANOVA, the findings of the study indicate a positive and significant relationship between TaxPro-Max for online taxes, TaxPro-Max for online returns filing and tax remittance by FIRS at 1% and 5% significant level respectively, Thus, concluding that the adoption of TaxProMax enhances internally generated revenue and tax remittance by FIRS.

Irefe-Esema and Akinmade (2020) examined the impact of tax automation on tax compliance in Nigeria using the tax compliance metrics (registration, filling, reporting and payments) of the Organisation of Economic Community Development. Their paper describes the Nigerian e-tax system as semi-automated, considering that numerous manual processes are involved in the registration, filing, reporting and payment of taxes. Adopting a structured in-depth interview, administered to tax professionals, comprising tax consultants and staff of the Nigerian Federal Inland Revenue Service (FIRS), they found out that automation significantly increased tax registration and payment compliance. However, filing and reporting compliance showed no positive response. Their findings in the paper emphasise the prospect of attaining optimum compliance level in the Nigerian tax system, and a prompt to policymakers and tax authorities (FIRS) to consider implementing full tax automation.

Ogechukwu (2019) studied the effect of taxation on economic growth (2007-2017). The specific objectives were to; evaluate the effect of petroleum profit tax on the real gross domestic product of Nigeria, examine the impact of company income tax on the real gross domestic product of Nigeria and determine the impact of custom and excise duty on the real gross domestic product of Nigeria. The study adopted ex-post facto. The study made use of secondary data obtained from the Central Bank of Nigeria Statistical Bulletins for the relevant years. The hypotheses were tested using unit root test and regression analysis statistical tools. The study found that the variables identified all had a significant effect on the gross domestic product of Nigeria.

Olurankinse & Oladeji, (2018) examined self-assessment, electronic tax payment systems, and revenue generation in Nigeria. The study population comprised 30 companies listed on the Nigerian Stock Exchange. The Pearson Product Moment Correlation Coefficient statistical tool and regression analysis were used to test the hypothesis. The results of the analysis showed a positive and significant relationship between self-assessment and e-tax payment systems and revenue generation.

3. METHODOLOGY

The study is a time series trend studies. This study is focused on the effect of ICT Tax infrastructure has on economic Growth. The study applied secondary data obtained from the Federal Inland Revenue Service Tax data and GDP figures obtained from the National Bureau of Statistics for a period spanning from the first quarter of 2017 to the second quarter of 2022. In analysing the data gathered, Ordinary least square regression was deployed to examine the association between the dependent and independent variable.

The following model is specified:

$$GDP = \beta o+\beta 1VAT+\beta 2SDC+eit.....1$$

Where:

GDP = Gross Domestic Product reported on a quarterly basis. The proxy for Gross domestic product is GDP Manufacturing. This is justified by the effect Manufacturing has on Indirect taxes.

β1VAT = Value added tax ICT infrastructure proxy by VAT collections reported on a quarterly basis.

β2SDC = Stamp duty Tax ICT infrastructure proxy by stamp duty collection reported on a quarterly basis.

The a priori expectation is that stamp duty and value added tax has a positive and significant effect on Gross Domestic Product both in the long and short run. It might however be erroneous to assume that ICT is the only indicator for improved Tax collections in Nigeria, even though it is established that ICT enhances effectiveness in tax administration. This may serve as a limitation to the study.

4. RESULT AND DISCUSSION

The variables utilized in this study as determined in the model details are VATrac and ISDLS proxy by VAT collections and Stamp Duty collections. E.views was used to run the regression analysis and the results are presented below.

4.1. Result

4.1.1. Descriptive Statistics

Table 1. Descriptive Statistics (E-views 10, 2023)

	GDPM	SD	VAT
Mean	4418.613	10.02818	348.3345
Median	4256.940	4.505000	310.9100
Maximum	7034.893	62.58000	563.7200
Minimum	2422.505	0.490000	221.3800
Std. Dev.	1555.834	15.14255	104.4154
Skewness	0.280425	2.621223	0.803188
Kurtosis	1.829821	8.800126	2.267214
Jarque-Bera	1.543548	56.03097	2.857633
Probability	0.462192	0.000000	0.239592
Sum	97209.48	220.6200	7663.360
Sum Sq. Dev.	50833017	4815.235	228954.0
Observations	22	22	22

The Table shows the mean, median, their maximum values, minimum values and standard deviation for each of the variables; i.e. GDP, Stamp Duty and Value added Tax. The result provides insight into the nature of the data effect for the entire period. The Jarque Bera simply measures the difference of the Skewness and kurtosis of the series with those from a normal distribution. The null hypothesis for a Jarque Bera Data set is that the data set is Normal at a 0.05% level of significance.

4.1.2. Correlation Matrix

Correlation analysis/Covariance helps us determine the degree of association among the variables. This helps to check the relationships between the dependent variables and the independent variables.

Table 2. Correlation Matrix Analysis (E-views 10, 2023)

Covariance Analysis: Ordinary			
Date: 10/06/22 Time: 23:42			
Sample: 1 22			
Included observations: 22			
Correlation			
t-Statistic			
Probability	GDPM	SD	VAT
GDPM	1.000000		

SD	0.228021	1.000000	
	1.047334	-----	
	0.3074	-----	
VAT	0.868104	0.278199	1.000000
	7.821156	1.295279	-----
	0.0000	0.2100	-----

The correlation Matrix table indicates that the variables are positively correlated. However VAT indicates a strongly more correlated to GDP than Stamp duty.

4.1.3. Unit Root Test

The study adopted the Augmented Dickey-Fuller Test to determine the stationarity of the model. A model that is stationary indicated that its descriptive properties are constant. This is important to eliminate meaninglessness in the data set (spurious data). The summary of the test is presented below.

Table 3. Unit Root Test Summary (E-views 10, 2023)

Variables	Levels		1st Difference	
	Intercept	Trend & Intercept	Intercept	Trend & Intercept
GDP	0.4627	0.5193	0.0000	**0.0001**
SD	0.4034	0.0023	0.0000	**0.0000**
VAT	0.6864	0.0240	0.1514	**0.0002**

The general rule of thumb is that a data series is stationary where P Value is less than or equal to 0.05 (5%). This is so for GDP and VAT where the variables are stationary at 1st Difference. However, SD is stationary at levels. With this result, The Johansen Co integration Test would be used to determine the if there is a long run relationship between or among the data set. It is as it would guide the researcher on the most appropriate model to use to estimate the hypothesis. However, it is expedient that in correcting the model, we do a Lag Selection.

4.1.4. Johansen Co Integration Test

The Johansen co integration test is used to determine whether there is a short term or long term relationship among the variables. The Johansen Model is used because the unit root test earlier adopted demonstrated that the data test statistics were all stationary at 1st difference.

4.1.5. Regression Results

Table 4. Test for Hypothesis Using Vector Error Correction Models (E-views 10, 2023)

Dependent Variable: D(GDPM)				
Method: Least Squares (Gauss-Newton / Marquardt steps)				
Date: 10/07/22 Time: 00:08				
Sample (adjusted): 4 22				
Included observations: 19 after adjustments				
D(GDPM) = C(1)*(GDPM(-1) - 515.631415173*SD(-1) + 10.2848467096				
*VAT(-1) - 2513.87863896) + C(2)*D(GDPM(-1)) + C(3)*D(GDPM(-2)) +				
C(4)*D(SD(-1)) + C(5)*D(SD(-2)) + C(6)*D(VAT(-1)) + C(7)*D(VAT(-2)) +				
C(8)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.020624	0.023561	-0.875334	0.4001
C(2)	-0.143737	0.225919	-0.636235	0.5376
C(3)	-0.335511	0.191182	-1.754927	0.1070
C(4)	-1.568560	9.874278	-0.158853	0.8767
C(5)	-14.75991	6.275267	-2.352076	0.0383
C(6)	2.926733	2.250454	1.300508	0.2200
C(7)	-2.235036	1.956019	-1.142645	0.2774
C(8)	-343.7185	98.22469	-3.499309	0.0050
R-squared	0.727342	Mean dependent var		-242.7573
Adjusted R-squared	0.553832	S.D. dependent var		514.7952
S.E. of regression	343.8618	Akaike info criterion		14.81392
Sum squared resid	1300650.	Schwarz criterion		15.21158
Log likelihood	-132.7322	Hannan-Quinn criter.		14.88122
F-statistic	4.191932	Durbin-Watson stat		2.119831
Prob(F-statistic)	0.017284			

The regression result using the vector error correction model shows that the independent variables in the models have a causal relationship in the long run with the dependent variables consistent with C(3) and C(6) above.

4.2. Discussion of Findings

From the model specification and results, it can be inferred that in the long run, there is a causal relationship existing between the independent variables i.e. stamp duty and Value added Tax on Gross Domestic Product. However, the relationship is not significant. But from the Wald Test, Stamp Duty has a short run and significant relationship with GDP at 0.036 (ie 3.6%) level of significance while Value added tax has a short run and significant relationship with GDP at 0.0236 (i.e. 2.3%) level of significance. The findings are consistent with studies like Beida (2022), Fabian and David (2021) who all show significant relationships between the taxes and economic growth whenever automation or ICT is introduced.

5. CONCLUSIONS AND RECOMMENDATTION

The findings affirm that the deployment of ISDLS and VATrac was indeed robust and effective in the short run, as it demonstrates a significant effect on Gross Domestic Product. The introduction of ICT Tax infrastructure in most tax jurisdictions has improved tax collection and economic growth. It is thus not far-fetched that Nigeria would experience the same. The significance in the short run and not in the long run may be an indication of several reasons including but not limited to governance, risk management, staff and taxpayers attitude. Government, through Federal Inland Revenue Services, should work out modalities on the best way to improve its digital transformation strategies and deploy more ICT Tax infrastructure in the tax value chain.

REFERENCES

Abdulrazaq, M. T. (2012). Introduction to VAT in Nigeria (2nd Ed.). Ababa Press Ltd.

Beida, P. O. (2022). Impact of ICT Tax Infrastructure on Nigeria's Economic Growth. BIJAF Journal, 3(1), 444-454.

Boyle, M. J. (2019). Neoclassical Growth Theory Definition - Economics. Investopedia. Retrieved August 16, 2022, from https://www.investopedia.com/terms/n/neoclassical-growth-theory.asp

Brandy, S. O., Kingi, M., & Peace, L. (2008). Effect of e-filing on revenue generation in Malaysia. Journal of Accounting Research, 46(5), 1085-1142.

Efunboade, A. O. (2014). Impact of ICT on Tax Administration in Nigeria. Computer Engineering and Intelligent Systems Journal, 5(8), 2-76.

Ekpenyong, E., Sanni, S., & Otakpor, J. (2021). New Legal Regime on Stamp Duty Charges in Nigeria under the Finance Act, 2019 - Financial Services - Nigeria. Mondaq. Retrieved August 17, 2022, from https://www.mondaq.com/nigeria/financial-services/1135682/new-legal-regime-on-stamp-duty-charges-in-nigeria-under-the-finance-act-2019.

Fabian, O., & David, S. (2021). Effect of Adoption of Taxpro-Max on Firs Tax Remittance in Nigeria. International Journal of Trend in Scientific Research and Development (IJTSRD), 6(1) 41-74.

FIRS, (2022). VAT Automation Programme. FIRS. Retrieved August 15, 2022, from http://firs.gov.ng/vat-automation-programme.

Irefe-Esema, J., & Akinmade, B. (2020). Automation and Tax Compliance: Empirical Evidence from Nigeria. American Journal of Theoretical and Applied Business, 8(3), 45-58.

Irefe-Esema, K., & Peace, L. (2020). Contentious issues in value added tax Act and administration in Nigeria (being paper presented at the CITN MPTP at Ibadan). Ibadan, Nigeria.

John Fleming, C. (1970). Impact of of Nigeria's revenue and economic growth: A Pre - Post Analysis. International Journal of Finance and Accounting, 7(2), 19 -26.

KPMG. (2020). KPMG NG | FIRS Automates Value Added Tax Filing and Collection VAT. KPMG International. Retrieved August 16, 2022, from https://home.kpmg/ng/en/home/insights/2020/03/firs-automates-value-added-tax-filing-and-collection-system.html.

Nobel, C. (2012). How Technology Adoption Affects Global Economies - HBS Working Knowledge. HBS Working Knowledge. Retrieved August 16, 2022, from https://hbswk.hbs.edu/item/how-technology-adoption-affects-global-economies.

Nwamgbebu, O. E., Nkwede, E., & Chikaodiri, N. (2021). Electronic Tax System and Internally generated revenue in the Nigerian emerging economy: The study of Ebonyi state board of internal revenue. International Journal of Academic Research in Accounting, finance and management Sciences, 11(2), 123-149.

Ogechukwu, N. M. (2019). The Effect of Taxation on Economic Growth (2007-2017). European Journal of Social Sciences, 9(2), 100-150.

Olurankinse, F., & Oladeji, O. E. (2018). Self-Assessment, Electronic Taxation Payment system and Revenue Generation in Nigeria. Accounting and Taxation Review, 2(1), 39-55.

Premium Times (2023). FIRS breaks 2021 record collects N10.1 trillion in 2022- Press Release. 2023 retrived from https://www.premiumtimesng.com/news/top-news/577391-firs-breaks-2021-record-collects-n10-1-trillion-in-2022.html.

Van, M. A. (2013). Economic Theory: A Critic's Companion. Springer Netherlands. https://doi.org/10.1007/978-94-017-1365-8_7.

Yashim, C. (2022). ACC 826 - Advanced Economic Theory (Lecture Notes on Economic Theory).

Volume XIX, Issue (1) (2023) 447-456

International May Conference on Strategic Management

ENTREPRENEURSHIP EDUCATION: A TOOL FOR ECONOMIC AND NATIONAL DEVELOPMENT

Oiku Peter Omoyebagbe*

Department of Business Administration, Faculty of Management Sciences, Ajayi Crowther University, Oyo, Oyo State, Nigeria

Abstract: In the world over, the constant increase in the level of unemployment has awakened government at all levels to realize the importance of entrepreneurship education as a stimulant for driving economic growth and development. This work is a review of entrepreneurship education, a General Studies programme of Ajayi Crowther University, Oyo and its relevance to national development. A survey questionnaire was formulated and sent to progressing ex-students of Ajayi Crowther University who are applying the knowledge gained from General Studies (GES) of Entrepreneurship Education rather than their primary field of study in establishing their own businesses. The review showed that entrepreneurship education is a tool that is needed for building soft skills in students, reducing the rate of unemployed university graduates and enhancing economic and national development. The paper recommends a constant review on technical skills training, creation of idea incubators, industrial attachments and programmes relative to students' field of study.

Keywords*:* Entrepreneurship education, Students, Skills, National Development, Economic Growth

1. INTRODUCTION

The world is constantly evolving as nations and economies are being shaped and directed by entrepreneurs. The deplorable state of unemployment and level of poverty in Nigeria has created a platform and drive for a lot of individuals to look towards entrepreneurship without proper training, information literacy and emotional intelligence. There is no doubt that entrepreneurship is a tool for positive change, economic development and innovations.

In spite of several efforts that have been made by both government and private organizations, the effect of entrepreneurship programmes has not been felt due to the inability to bridge the gap between entrepreneurial training and vocational skill training which created the need for Entrepreneurship education. Based on the structural and functional flaws found in the nation's developmental blueprint, it then dawns on government that the proper thing to do is to review the nation's education curriculum by embedding entrepreneurship education as a compulsory course to be taken by all undergraduate students. The Nigerian higher education system fails to adequately prepare graduates for the job market, leading to a mismatch between industry expectations and the skills possessed by graduates. This structural imbalance rendered many graduates of Nigerian higher institutions unemployable and

* *Corresponding author: op.oiku@acu.edu.ng*

hopeless. It is in this regard that the Federal Ministry of Education directed that entrepreneurship education be included as part of the curricula of the universities, polytechnics and colleges of education through the National Universities Commission (NUC), National Board for Technical Education (NBTE) and National Commission for Colleges of Education (NCCE) effective from 2007/2008 academic session (ILO, 2011; Gabadeen & Raimi, 2012).

This paper is based on the mandatory entrepreneurship education taken at the undergraduate level in Nigerian universities. The programme which is laudable can be improved to be more relevant to economic and national development.

1.1. Statement of Problem

A critical examination of the educational sector in Nigeria shows that very little or nothing is being done in the area of entrepreneurial, technological and scientific education that should make beneficiaries develop skills, abilities and ideas for national growth and development. The failure to achieve the objectives of entrepreneurship education in tertiary institutions could be attributed to lack of manpower and infrastructural and instructional facilities, inadequate provision of funds, unstable social and political climate, lack of harmonized entrepreneurship curriculum and harsh business environment. The problems confronting entrepreneurship education in tertiary institutions has made it necessary to examine entrepreneurship education as a tool of enhancing national growth and development.

1.2. Research Questions

The following research questions were raised to guide this study:

1. What are the developmental tasks and benefits of entrepreneurship education in Nigerian tertiary institutions for economic and national development?
2. What are the challenges facing entrepreneurship education in Nigerian tertiary institutions for economic and national development?

1.3. Objective of the Study

The objective of this study is to:

1. Study the impact of entrepreneurship education on fresh graduates in Nigeria.
2. Analyse the way entrepreneurship education is conducted in Nigerian universities and recommend more effective ways in which undergraduates can be imparted with it.
3. Elucidate the linkage between entrepreneur education and economic and development in Nigeria.

1.4. Hypotheses of the Study

For the purpose of this study, the following null hypotheses are formulated;

$H0_1$: Entrepreneurship education does not have a significant effect in the economic and national development of Nigeria.

$H0_2$: Entrepreneurship education does not reduce the unemployment rate of fresh university graduates in Nigeria.

Figure 1. Ajayi Crowther University Curriculum for Entrepreneurship education

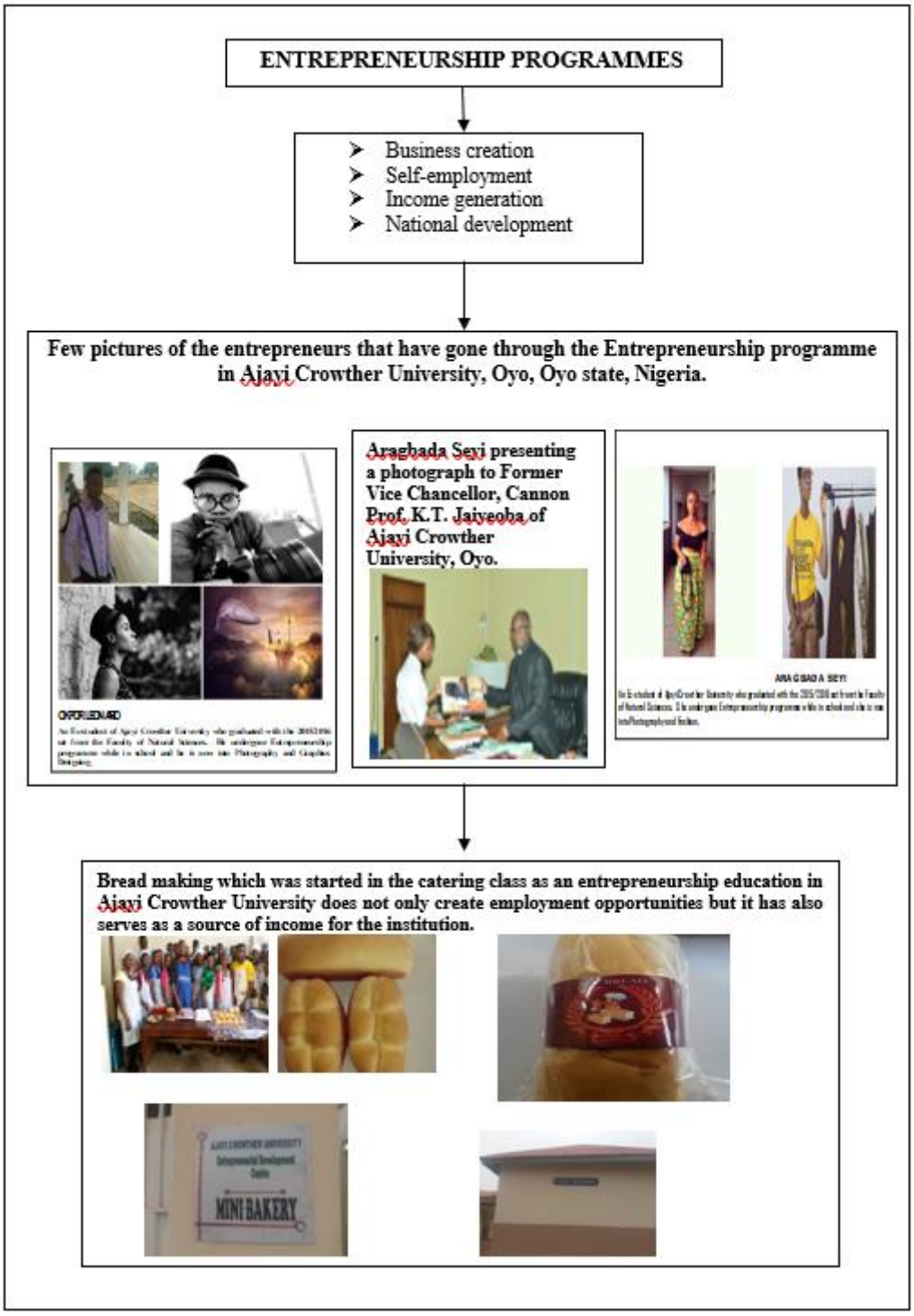


Figure 2. Positive results of the entrepreneurship programmes in Ajayi Crowther University

2. LITERATURE REVIEW

An entrepreneur is defined as someone that ventures into a business with the aim of making profit. The word entrepreneurship is gotten from the French word *"entreprendre"* meaning 'means to undertake', thus, entrepreneurship can be considered as the process of emergence, behaviour and performance of an entrepreneur which can be achieved through a formal process of educating an individual on theoretical, vocational and soft skill training

(Ogundele, 2004). Entrepreneurship is the willingness and ability of an individual to seek for investment opportunities, to establish and to run an enterprise successfully. The entrepreneurship spirit is a pre-requisite to an entrepreneurial society and culture. This spirit is required for the overall economic growth of any nation especially developing ones like Nigeria. The personality traits of an entrepreneur include; versatility, self-motivation, creativity, business skills, marketing and foresight.

Entrepreneurship education is the incorporation into the students' mind, steps involved in starting a new business based on a recognized business opportunity as well as operating and maintaining that business. The belief of some people is that entrepreneurship education does not need to be taught and therefore an entrepreneur is born and not trained or made. It should however be noted that for one to be a successful entrepreneur, he/she needs to learn the requisite skills (Griffin & Hammis, 2001).

Economic development is the process whereby simple, low-income national economies are transformed into modern industrial economies. Although the term is sometimes used as a synonym to *economic growth*, generally it is employed to describe a change in a country's economy involving qualitative as well as quantitative improvements.

National development can be described as the overall development or a collective socio-economic, political as well as religious advancement of a country or nation. This is best achieved through development planning which can be described as the country's collection of strategies mapped out by government. (Ebue & Onyeze, 2016).

2.1. Roles of Entrepreneurship Education in Economic and National Development in Nigeria

The introduction of Entrepreneurship education in Nigerian tertiary institutions is actually a direct response to the changing socio-economic and political conditions in the world and Nigeria in particular (Agbim et al., 2015). Entrepreneurship education can greatly help in addressing the level of poverty in the country (Akinyemi, 2017). The issue of poverty eradication has been a top priority of many governments and institutions, especially in developing countries where extreme poverty is conspicuous and has become a pandemic. The rate of poverty in Nigeria is on the high side, where about 80% of the total population has been classified as poor (Aremu & Adeyemi, 2011). This state may be seen as a direct consequence of the absence of entrepreneurial spirit and culture which Entrepreneurship education is supposed to foster (Anyadike & Atuma, 2015). In other words, the relevance of Entrepreneurship education is felt more in the area of checking or reducing poverty. Entrepreneurship education equally helps in checking high dependency ratios in the country. Once the working population are adequately equipped with these entrepreneurial skills thereby leading to self-employment, burden arising from dependent population will be reduced (Akinyemi, 2017).

Entrepreneurship education is relevant to economic and national development in the following ways:

1. Innovation and Technological Advancement: For an entrepreneur to sustain his/her business, there is a need to get ahead of one's competitors but mostly faced with constraints not just financial but also technologically which drives the entrepreneurs to look inward therefore improving an economies indigenous technological base which causes a quick transformation in a nation's economy (Agbim et al., 2015).
2. Rural Sufficiency: In Nigeria, one of the greatest challenges is the high level of rural-urban migration which in most urban areas brings an increase in the rate of negative vices being experienced. Entrepreneurship education is instrumental to

rural areas for indigenes to understand the business and profit potentials around them (Onugu et al., 2014).

3. Reduction in Importation and Increase in Nigeria's Gross Domestic Product (GDP): Entrepreneurship education creates a platform for increase in manufacturing and production of goods thereby increasing export and improving our foreign exchange (Anyadike & Atuma, 2015).

2.2. Challenges Facing Entrepreneurship Development in Nigeria

Nigeria as a nation is saddled with setbacks that affect the harnessing of the great potential available with growth of entrepreneurship. A few of these challenges are highlighted as follows:

1. Inadequate Financial Literacy: In recent years, government efforts have been on the acquisition of trade and vocational skills which help entrepreneurs to start the business and the lack of financial management to sustain it.
2. Inadequate Infrastructure: As a developing economy this challenge is the most paramount as the cost of running a small business is expensive, unavailability of regular power supply, lack of good and accessible road and increase in the level of corruption.
3. Lack of Soft Skills: For an individual to bridge the gap between theoretical knowledge and technical skill there is a need for soft skills which enable an entrepreneur to sustain a business by risk taking, character and emotional intelligence.

3. RESEARCH METHODOLOGY

This paper is based on the case study of Ajayi Crowther University Entrepreneurship Education curriculum relative to its impact on graduates from the school that have been able to establish their businesses. The data collection was done through questionnaire which was administered to thirty-four (34) graduate students of Ajayi Crowther University.

The primary data collection was done through a questionnaire which was administered to thirty-four (34) graduate students of Ajayi Crowther University. Interviews with interviewees are conducted and participants answered each question on a scale of 1 to 5; 5 stands for 'Strongly Agree', 4 stands for 'Agree', 3 stands for 'Neutral', 2 stands for 'Disagree' and 1 stands for 'Strongly Disagree'. Information was also extracted from secondary sources in addition to primary data collection. Also, the author collected information from secondary sources like; publications of the nation, magazines, book, journals, and reports.

4. ANALYSIS

Data analysis is an important part of the research. To better visualize the data, the author will use the available information. In the case of a study method and probability sample, the author will use a quantitative approach to evaluate results. For the statistical analysis, precise statistical illustrations will be used, and the exact results will be estimated. In order to interpret data accurately and statistically, the author uses a variety of methods and procedures, including Microsoft Excel and similar applications. The author uses many technologies and applications as well as various graphs with a pie chart, map, bar chart, etc. to display the results of the analysis.

In the conduct of surveys and interpretation of the results, demographic analysis is vital. A population analysis specifies the demographics of the samples found in this survey. The survey includes demographic questions emphasizing the name, age, gender, education and employment of respondents.

Table 1. Genders of the respondents

Gender	**Frequency**	**Percentage**
Male	21	61.8%
Female	13	38.2%
Total	***34***	***100%***

The table (Table 1) above indicates that 61.8% of the respondents were males and 38.2% were females. There were, therefore, more males than females. The pie-chart below illustrates the gender gap of the respondents.

Table 2. Ages of the respondents

Age	**Frequency**	**Percentage**	**Cumulative Percentage**
Below 25	5	14.7%	14.7%
25 – 35	22	64.7%	79.4%
36 – 50	7	20.6%	100%
51 above	0	0%	100%
Total	***34***	***100%***	

The ages of the participants (as shown Table 2 above) are significant because their age reflects their wisdom and life experiences which affect their views about entrepreneurship education in Nigeria. This study comprises; 14.7% of respondents below the age of 25 years, 64.7% of respondents between the ages of 25 – 35 years, 20.6% of respondents between the ages of 36 – 50 years, and 0% of respondents who are 51 years and above. The analysis showed that there are no respondents who are between 51 years and above in age and the majority who are between 25 – 35 years of age had good and study-friendly experiences.

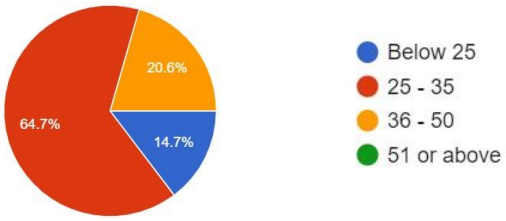


Figure 3. Diagrammatic illustration of the age differences of the respondents

Table 3. Occupation of the respondents

Occupation's	**Frequency's**	**Percentages**	**Cumulative Percentages**
Service holders	18	52.9%	52.9%
Businesspersons	11	32.4%	85.3%
Others	5	14.7%	100%
Total	***34***	***100%***	

Taking a close look on the Table 3, we can see the special activities of the participants. We can see from the table that the minority; 14.7% of the respondents are involved in 'Other' occupations (occupations that are different from being a Businessperson or a Service holder). Other participants (52.9% Service holders and 32.4% Businesspersons) have deeper knowledge of Entrepreneurship and how it works in practice.

The questioning for the quantitative data was carried out closely. The questions were structured in a way that will satisfy the different study objectives. Each aim was evaluated using data related to the goals by setting nine questions per target. In particular, on the 5th scale of Likert, many questions are measured- 1 as "Strongly disagree", 5 as "Strongly agree."

Table 4. Analysis of quantitative data

Scales	**Frequency**	**Percentages**	**Cumulative Percentages**
Strongly disagree	2	0.65%	0.65%
Disagree	14	4.57%	5.22%
Neutral	51	16.67%	21.89%
Agree	103	33.67%	55.56%
Strongly agree	136	44.44%	100%
Total	**306**	**100%**	

A summary of the survey replies *"Entrepreneurship education has a significant impact on the economic and national development in Nigeria and students should be encouraged and supported to start-up their own businesses"* indicate; 0.65% strongly disagreed, 4.57% disagreed, 16.67% are neutral, 33.67% agreed and 44.44% strongly agreed. Based on this analysis, it can be said that entrepreneurship education has a significant impact on economic and national development. The bar-chart below indicates the responses of the interviewees

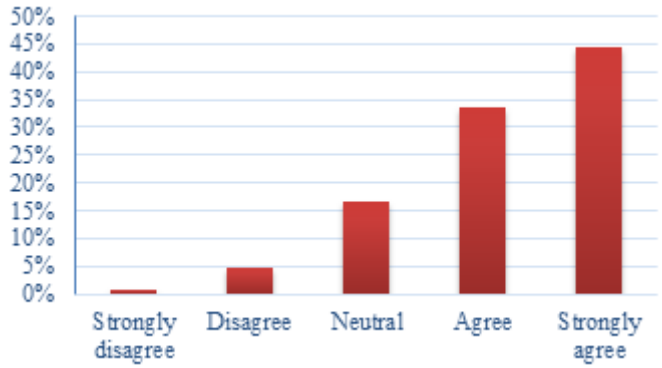


Figure 4. Responses of the interviewees

5. RESULTS AND DISCUSSION

The summary of the survey questions in the questionnaire is to confirm if Entrepreneurship education has a significant impact on the economic and national development of Nigeria. It was found that entrepreneurship education does have a significant impact in the economic and national development of Nigeria but entrepreneurship education is not taught by experienced lecturer in Nigerian university. In other words, the amount of entrepreneur experts in the country is not enough to impact university undergraduates with a deep knowledge of entrepreneur, this problem can be solved by organizing professional

conferences and workshops for lecturers in the field of entrepreneurship education, providing good infrastructure to boost the effectiveness of the entrepreneurship programme and providing an effective funding strategy for the programme in Nigerian universities.

Further study of secondary data reveals that entrepreneurial education is a tool that is needed to build soft skills in students which will help to reduce the high rate of unemployment in the country. Also, in order to combat the problem of high-rate of unemployment of university graduates in Nigeria, more effort and focus should be put on entrepreneurship education as it is an effective tool to end the narrative of joblessness of Nigerian youths. The recent rise in the number of small and medium scale enterprises in Nigeria is evidence. As most university students graduates from school, many of them immediately starts a small business that will be generating money for him or her through the knowledge of entrepreneurship that he/she has gained from the university, this is an evidence that entrepreneurship education has a significant impact on the economic and national development of Nigeria.

6. CONCLUSION

Entrepreneurship education is evidently relevant to economic and national development. Most governments' programmes are targeted at aspects of entrepreneurship; however entrepreneurship education give a more holistic approach. Entrepreneurship education also helps undergraduate to understand various employment options to make decision faster, e.g. pursuing a job in the ministry of agriculture or starting one's own farm.

It can be concluded that when students are intimated with the ideology, concepts, theories and principles required to make one an entrepreneur; It will expose undergraduates to opportunities abound in entrepreneurship which will create a relative increase in the establishment of business; and it will increase the level of wealth creation in the economy and a relative decrease in the level of poverty.

In conclusion, tertiary institutions that have the entrepreneurship education in their curriculum should make constant reviews on technical skills training, creation of idea incubators, industrial attachments and programmes relative to students' field of study so as to enhance and build on the entrepreneurship spirit of students.

REFERENCES

Agbim, K. C., Oseghale, B. O., & Ojo, T. D. (2015). Entrepreneurship education and economic development in Nigeria. Journal of Education and Practice, 6(9), 76-81.

Akinyemi, O. I. (2017). Entrepreneurship education and poverty reduction in Nigeria: An empirical analysis. Journal of Entrepreneurship Education, 20(2), 1-12.

Anyadike, N. O., & Atuma, O. K. (2015). Entrepreneurship education and economic development in Nigeria. International Journal of Humanities and Social Science Research, 5(1), 1-9.

Aremu, M. A., & Adeyemi, S. L. (2011). Entrepreneurship and poverty reduction in Nigeria: The role of entrepreneurial education. Journal of Economics and Sustainable Development, 2(3), 1-9.

Ebue, B. I., & Onyeze, I. A. (2016). Development planning and national development in Nigeria. International Journal of Humanities and Social Science Invention, 5(2), 36-40.

Gabadeen, W. O., & Raimi, L. (2012). Management of Entrepreneurship Education in Nigerian Higher Institutions: Issues, Challenges and Way Forward. Abuja International Journal of Education and Management Sciences (ABIJEMS), 2, 1-26.

Griffin, C., & Hammis, D. (2001). What comes after what comes next: Self-employment as the logical descendant of supported employment. Journal of Vocational Rehabilitation, 16(1), 27-37.

International Labour Organization. (2011). ILO activities in Nigeria. United Nations System in Nigeria. Retrieved from: http://www.un-nigeria.org/unagencies/ilo.html/ (Accessed on March 20, 2023)

Ogundele, O. J. K. (2004). Entrepreneurship and Entrepreneurship in Business Organizations. In O. J. K. Ogundele (Ed.), Introduction to Business Organisation; A Book for Readings (pp. 348-365). Lagos: Molofin Nominees.

Onugu, C. U., Okereke, I. E., & Eze, S. C. (2014). Entrepreneurship education and rural development in Nigeria. International Journal of Management and Sustainability, 3(2), 31-42.

Volume XIX, Issue (1) (2023) 457-465

International May Conference on Strategic Management

MULTI-CRITERIA SELECTION OF SUPPLIERS USING THE AHP METHOD AND THE EXPERT CHOICE SOFTWARE PACKAGE

Ermina Ćosović*, Ivan Mihajlović, Vesna Spasojević-Brkić

University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia

Abstract: The world is globalized and highly dependent on efficient supply chains, so logistics activities and suppliers are becoming more and more important under such conditions. Supplier selection represents a multi-criteria decision-making problem, where the decision is influenced by several mutually conflicting factors in the procurement process, therefore a trade-off analysis between the defined criteria must be performed. The supplier selection process would be simple if only one criterion influences the decision. However, in most cases decision makers must consider a number of criteria when making this appropriate decision. Taking into account the problems that companies may have due to an inadequate selection of suppliers, starting from the wrong quantities assessment when purchasing materials, or preferring only one criterion (eg price), as well as other problems, the AHP model represents a possible solution so that, in the process of selecting suppliers, errors are eliminated or reduced to a minimum.
The subject of this research paper is the multi-criteria selection of suppliers using the AHP methodology with the help of the Expert Choice 11 software package. The aim of the research is the ranking of suppliers based on defined decision criteria.

Keywords: supplier selection, multi-criterial decision making, AHP

1. INTRODUCTION

In modern market conditions, it is necessary to reach a high level of all functions within the company, in order to achieve success in the market. Modern business conditions require rapid adaptation to changes in the environment, therefore companies need adequate supply chains. The procurement function includes a large number of different activities, and is the primary function for any company. Its effectiveness depends to a large extent on the adequate selection of suppliers. In most cases, it is possible to procure from several suppliers. Determining the number and the selection of suppliers should be done carefully, because tying to only one supplier can cause a number of problems. Taking into account the problems that companies have when choosing an inadequate supplier, starting from the wrong assessment when purchasing materials, or preferring only one criterion, as well as other problems, the AHP model represents the best possible solution in order to eliminate or minimize errors in the supplier selection process.

* *Corresponding author: cosovicermina2309@gmail.com*

2. SELECTION OF SUPPLIERS

Basically, supplier selection is a decision-making procedure with the aim of reducing the preliminary group of potential suppliers to the final selection of one or a group of suppliers (De Boer et al., 2001).

When choosing a supplier, it is necessary to look at the organization's procurement policy. Namely, a certain number of companies from the private sector decide to choose only one supplier for a certain group of products, while another group of companies purchases goods through two or more suppliers. Each of the options when choosing a supplier has its advantages and disadvantages. In practice, PARETO OPTIMUM 80:20 is often used, which proved to be the best solution because 80% of the procurement is covered by one supplier, while the remaining 20% is shared by others. It should be borne in mind that each of the suppliers receives a sufficiently large share that will stimulate him to make the maximum effort in satisfying the needs of the clients.

The selection of suppliers is based on evaluation criteria. The criteria themselves depend on the activity of the company, the amount of goods purchased, and the like. In the literature and various publications that deal with the same or similar problems as in this paper, a large number of criteria for evaluating suppliers can be found, however, the question arises as to how to choose the right ones from a certain set, by means of which the best solution will be chosen.

Dickinson, (1966) is considered to be the pioneer in this field, who was the first to conduct a study on supplier evaluation in which he defined a set of 23 criteria on the basis of which the evaluation and selection of the most favorable supplier could be performed. According to Weber, quality is the most important criterion for choosing a supplier. This is followed by delivery and costs (Weber et al., 1991). Some of the authors note that price is the only criterion for choosing a supplier. However, Talluri and Narasimhan (2003) conclude that price cannot be the only criterion when choosing a supplier.

Bearing in mind the necessity of simultaneous evaluation of a large number of criteria in the adequate selection of suppliers, the presence of modern methods of multi-criteria decision-making in this process is increasing, both in practice and in recent publications. Dweiri et al. (2016) in theirs paper presents the application of an integrated decision support system, based on the AHP method. Rakesh et al. (2022) in theirs paper presents the application of the AHP - TOPSIS method in the selection of suppliers in international supply chains. Also, in addition to techno-economic criteria, sustainability criteria are increasingly present - in relation to the impact of supply chain activities on ecology and ergonomics, in the selection of adequate suppliers (Marzouk & Sabbah, 2021).

Therefore, most procurement experts agree that there is no single best way to evaluate and select the best supplier, so companies use different approaches to solve this business problem. Regardless of the approach used, the ultimate goal of supplier evaluation should be to reduce procurement risk and maximize profits for the procuring company. In modern business systems, the application of the concept of Industry 4.0 and the Lean concept of production, in the optimization of logistics flows of companies, which includes the application of expert decision support systems, based on the application of modern techniques of multi-criteria analysis is increasingly common (Hasan et al., 2020; Dossou et al., 2022).

3. RESEARCH METHODOLOGY

The Analytical Hierarchy Process (AHP) was developed by Thomas Saaty. It is one of the most commonly used multi-criteria decision-making methods (Saaty, 1980). The supplier

selection process using the AHP method consists of six steps: defining criteria and alternatives, development of hierarchy, evaluating criteria and calculating weight coefficients, evaluating alternatives based on each criterion separately, evaluating alternatives on the basis of all criteria, and decision making.

The first step in the application of the AHP method involves defining the objective, criteria and alternatives. In this paper, 3 alternatives (suppliers) will be compared, based on 7 criteria.

Developing a problem hierarchy is the second step in the supplier selection process using the AHP method. Figure 1 shows the hierarchical structure of the decision problem.

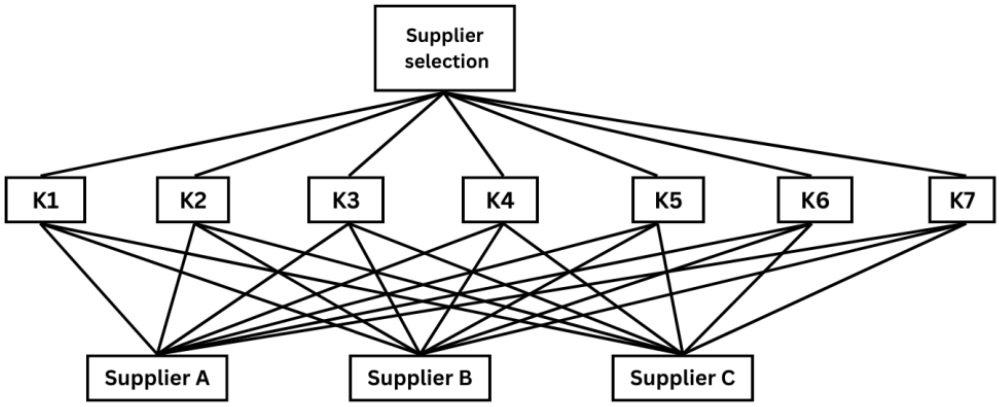


Figure 1. Hierarchical structure of decision problem

In the third step of the research, the evaluation of the criteria for the selection of suppliers and the defining of the weight coefficients required for the assessment and selection of suppliers will be carried out. Evaluation of the criteria is done on the basis of Saaty's nine-point scale shown in Table 1.

Table 1. Saaty's Rating Scale (Polat & Eray, 2015)

Numerical value	Definition	Explanation
1	Equal Importance	Two factors have an equal contribution to the objective.
3	Moderate important	Experience and judgment slightly favor one element over the other.
5	Strong important	Experience and judgment strongly favor one element over the other.
7	Demonstrated important	Experience and judgment very strongly favor one over the other.
9	Absolute important	Experience and judgment absolutely favor one over the other.
2,4,6,8	Intermediate values	When compromise is needed.

In the fourth step of the research, the alternatives are evaluated based on each criterion. Each of the 3 alternatives will be evaluated in it, based on all 7 considered decision criteria.

In the fifth step, alternatives are evaluated based on all criteria. During this step, each of the alternatives will be assigned its value.

The sixth step involves making a decision and choosing between alternatives.

4. RESULTS AND DISCUSSION

As an example of the application of the considered methods, a company is presented which finds itself in a situation where it has to choose one of three suppliers for the procurement of a certain group of products. For less complex problems, which fall within the domain of the AHP method, an approximation (calculation) procedure can be used. The following criteria, which are shown in Table 2, will be taken into account when choosing a supplier.

Table 2. Supplier selection criteria

Label	The name of the criterion	Importance of criteria
K1	Product quality	Product quality, on one hand, represents a certain level of fulfilment of requirements for regulations and standards, and on the other, a certain level of fulfilment of customer expectations.
K2	Product price	The price of the product represents the monetary value of the goods determined by the supplier on the basis of investment cost in the form of materials, energy, labor, etc.
K3	Technological capability	Technological capability encompasses the technology, design, methods and equipment used to produce a product or provide a service.
K4	Financial stability	Financial stability implies the liquidity of the company's operations, meaning a possibility of a financial response to all the requests.
K5	Product range	The product range represents a set of products that one manufacturer, in that moment, offers on the market.
K6	Delivery time	The delivery deadline is the time period between the initial offer for the order and availability of goods to consumers.
K7	Costs of transport	Transport costs represent the monetary value that the customer needs to pay the delivery company, in this case the supplier or a third party entrusted with the transport.

For the solution of this problem, an approximate procedure for obtaining the eigenvectors will be used. That procedure consists of following steps:

Step 1: Create a pairwise comparison matrix;

Step 2: Find the sum of all elements in each column;

Step 3: Divide the elements of each column by the sum of the values of that column, which was obtained in the previous step;

Step 4: Find the sum of all elements in each row and then determine the mean value of each row. The column consisting of those mean values is actually a normalized eigenvector.

The comparison of the criteria and the normalization of the eigenvector is shown in Table 3.

After evaluating the criteria, it is necessary to evaluate the suppliers based on each criterion individually (Tables 4, 5, 6, 7, 8, 9, 10).

Table 3. Determination of the normalized eigenvector

	K1	K2	K3	K4	K5	K6	K7	Criteria importance
K1	0.105	0.071	0.091	0.102	0.267	0.095	0.094	0.118
K2	0.316	0.214	0.182	0.203	0.133	0.286	0.188	0.217
K3	0.105	0.107	0.091	0.034	0.133	0.048	0.188	0.101
K4	0.105	0.107	0.273	0.102	0.067	0.190	0.063	0.129
K5	0.053	0.214	0.091	0.203	0.133	0.095	0.188	0.140
K6	0.105	0.071	0.182	0.051	0.133	0.095	0.094	0.105
K7	0.211	0.214	0.091	0.305	0.133	0.190	0.188	0.190
Sum	1	1	1	1	1	1	1	

Table 4. Determination of the normalized eigenvector based on the K_1 criterion

K1	Supplier A	Supplier B	Supplier C	Local significance
Supplier A	0.231	0.217	0.333	0.260
Supplier B	0.692	0.652	0.556	0.633
Supplier C	0.077	0.130	0.111	0.106
Sum	1	1	1	

Table 5. Determination of the normalized eigenvector based on the K_2 criterion

K2	Supplier A	Supplier B	Supplier C	Local significance
Supplier A	0.471	0.471	0.471	0.471
Supplier B	0.471	0.471	0.471	0.471
Supplier C	0.059	0.059	0.059	0.059
Sum	1	1	1	

Table 6. Determination of the normalized eigenvector based on the K_3 criterion

K3	Supplier A	Supplier B	Supplier C	Local significance
Supplier A	0.125	0.091	0.200	0.139
Supplier B	0.625	0.455	0.400	0.493
Supplier C	0.250	0.455	0.400	0.368
Sum	1	1	1	

Table 7. Determination of the normalized eigenvector based on the K_4 criterion

K4	Supplier A	Supplier B	Supplier C	Local significance
Supplier A	0.455	0.455	0.455	0.455
Supplier B	0.455	0.455	0.455	0.455
Supplier C	0.091	0.091	0.091	0.091
Sum	1	1	1	

Table 8. Determination of the normalized eigenvector based on the K_5 criterion

K5	Supplier A	Supplier B	Supplier C	Local significance
Supplier A	0.763	0.800	0.643	0.735
Supplier B	0.153	0.160	0.286	0.199
Supplier C	0.085	0.040	0.071	0.065
Sum	1	1	1	

Table 9. Determination of the normalized eigenvector based on the K_6 criterion

K6	Supplier A	Supplier B	Supplier C	Local significance
Supplier A	0.300	0.429	0.273	0.334
Supplier B	0.100	0.143	0.182	0.142
Supplier C	0.600	0.429	0.545	0.525
Sum	1	1	1	

Table 10. Determination of the normalized eigenvector based on the K_7 criterion

K7	Supplier A	Supplier B	Supplier C	Local significance
Supplier A	0.745	0.636	0.789	0.724
Supplier B	0.106	0.091	0.053	0.083
Supplier C	0.149	0.273	0.158	0.193
Sum	1	1	1	

The next step in the application of the AHP method is the comparison of alternatives (suppliers) based on all criteria. The synthesis of the supplier ranking problem is equal to the sum of the products of the weights within the observed criterion, ie. the sum of the overall significances for each alternative.

Table 11 shows the overall significance for each criterion.

Table 11. Determination of overall significance for each criterion

Criteria important for selection	Significance of criteria	Alternatives	Local significance	Overall significance
		A	0.2605	0.0301
K1	0.1155	B	0.6333	0.0731
		C	0.1062	0.0123
K2	0.2254	A	0.4706	0.1061
		B	0.4706	0.1061
		C	0.0588	0.0133
K3	0.0995	A	0.1386	0.0138
		B	0.4932	0.0491
		C	0.3682	0.0366
K4	0.1262	A	0.4545	0.0574
		B	0.4545	0.0574
		C	0.0909	0.0115
K5	0.1125	A	0.7352	0.0827
		B	0.1994	0.0224
		C	0.0654	0.0074
K6	0.1260	A	0.3338	0.0421
		B	0.1416	0.0178
		C	0.5247	0.0661
K7	0.1949	A	0.7235	0.1410
		B	0.0833	0.0162
		C	0.1932	0.0377

Alternative - Supplier A:

$T_A=K_1*K_1A+K_2*K_2A+K_3*K_3A+K_4*K_4A+K_5*K_5A+K_6*K_6A+K_7*K_7A=0.453$

Alternative - Supplier B:
$T_B=K_1*K_1B+K_2*K_2B+K_3*K_3B+K_4*K_4B+K_5*K_5B+K_6*K_6B+K_7*K_7B=0.362$

Alternative - Supplier C:
$T_C=K_1*K_1C+K_2*K_2C+K_3*K_3C+K_4*K_4C+K_5*K_5C+K_6*K_6C+K_7*K_7C=0.184$

Based on the obtained results, it is obvious that the best alternative is supplier A.

In addition to the standard method of application, the AHP method can also be implemented through software solutions. The best known and frequently used software for applying the AHP methodology is Expert Choice. In order to confirm and comprehensively analyze the problem, the multi-criteria selection of suppliers using the AHP methodology was also carried out through the mentioned software solution Expert Choice. The results of the research are shown in Figure 2.

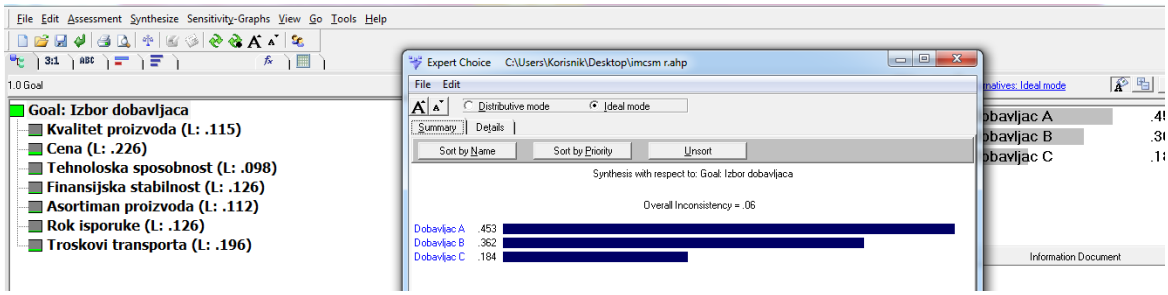


Figure 2. Research results using Expert Choice

The results of the research using the Expert Choice software package confirmed the original supplier selection results.

The total inconsistency is less than 10%, which means that the model is well structured. The vulnerability analysis can now be applied. A sensitivity analysis is conducted to gain insight into how the alternatives performed against each criterion as well as how sensitive the alternatives are to changes in the importance of the criteria.

This is important because the decision maker may be interested in seeing all the consequences due to variations in the criteria's weights. A certain influence may have been during ranking, or a slight change in the weight of one criterion may lead to a completely different decision. Expert Choice provides five sensitivity analysis methods: Dynamic, Performance, Gradient, Head to Head and Two-Dimensional.

The Dynamic option enables a dynamic graphic display insight into how the priority of alternatives dynamically changes if the weights of individual criteria change. By simple dragging of the mouse to the left or right, the importance of a certain criterion is decreased or increased, while the weights of the other criteria are proportionally changed in relation to the initial weights of the criteria.

Figure 3 shows the graphic representation of the Dynamic sensitivity analysis.

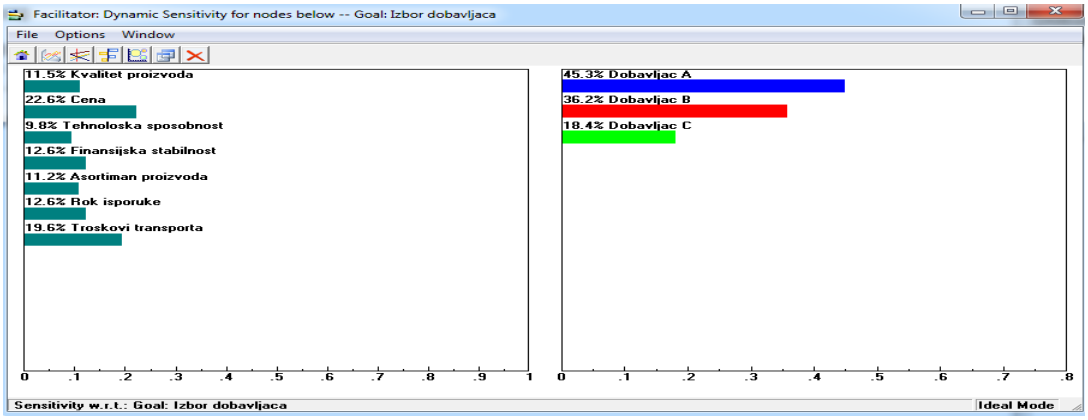


Figure 3. Sensitivity analysis - Dynamic Sensitivity

Figure 4 exhibits the situation after the change in the importance of the "Product quality" criterion. Increasing the importance of this criterion to 40% would give an edge to the "Supplier B" alternative, which would become dominant with almost 44.2% of the total value.

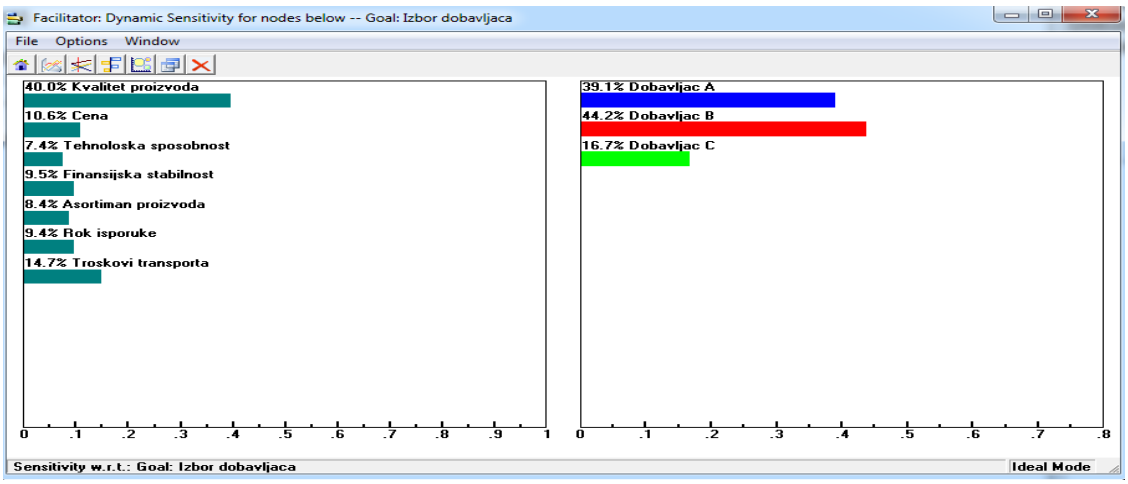


Figure 4. Sensitivity analysis - Dynamic Sensitivity after changing the criteria "Product quality"

5. CONCLUSION

This paper shows the execution of the process of multi-criteria supplier selection. In doing so, the following results can be distinguished:

- The criterion with the greatest importance for the analyzed company is criterion K2 - product price with a score of 0.2254, while based on the evaluations of the decision makers, it was determined that the least attention will be paid to criterion K3 - technological ability with a score of 0.0995.

- By comparing alternatives, i.e. suppliers based on each criterion individually, it was concluded that the best choice for the company, based on the product price criteria, is the alternative Supplier A with a score of 0.453.

In practice, it has been shown that companies that apply modern information technologies significantly reduce the costs of their operations. In this paper, the impact of the application of the Expert Choice tool on the success of the company's operations is indicated

trough support in business decision for the procurement process. This software can indeed have practical applications in various systems, i.e. areas of interest and it represents a powerful decision-making tool in many decision-making problems. The software enables managers to focus on the essence of the problem, criteria defining and recognition of mutual relationships of criteria in concrete examples of business practice. At the same time, the software performs all necessary mathematical operations in the background, without burdening the user.

Based on all of the above, it can be concluded in modern times, in a large number of cases, business decision-making is related to the adoption of unstructured multi-criteria decisions, and thus, it is not possible without the application of multi-criteria decision-making methods when, as a rule, there are a large number of conflicting criteria. For these purposes, modern methods of multi-criteria analysis can greatly contribute to making optimal decisions.

ACKNOWLEDGEMENT

This research was financially supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, on the basis of the Agreement on the realization and financing of scientific research work of the NIO in 2023. no. 451-03-47/2023-01/200105

REFERENCES

De Boer, L., Labro, E., & Morlacchi, P. (2021). A review of methods supporting supplier selection. European Journal of Purchasing & Supply Management, 7(2), 75-89.

Dickinson, G. W. (1996). An analysis of vendor selection systems and decisions. Journal of Purchasing and Supply Management. 2(1), 5-17.

Dossou, P. E., Torregrossa, P., & Martinez, T. (2022). Industry 4.0 concepts and lean manufacturing implementation for optimizing a company logistics flows. Procedia Computer Science 200, 358–367.

Dweiri, F., Kumar, S., Khan, S. A., & Jain, V. (2016). Designing an integrated AHP based decision support system for supplier selection in automotive industry. Expert Systems With Applications, 62, 273-283.

Hasan, M. M., Jiang, D., Sharif Ullah, A. M. M., & Noor-E-Alam, M. (2020). Resilient supplier selection in logistics 4.0 with heterogeneous information. Expert Systems With Applications, 139, 112799.

Marzouk, M., & Sabbah, M. (2021). AHP-TOPSIS social sustainability approach for selecting supplier in construction supply chain. Cleaner Environmental Systems, 2, 100034.

Polat, G., & Eray, E. (2015). An integrated approach using AHP-ER to supplier selection in railway projects. Procedia Engineering, 123, 415-422.

Rakesh, R., Menon, R., & Ravi, V. (2022). Using AHP-TOPSIS methodologies in the selection of sustainable suppliers in an electronics supply chain. Cleaner Materials, 5, 100130.

Saaty, T. L. (1980). The Analytic Hierarchy Process. New York: McGraw Hill International.

Talluri, S., & Narasimhan, S. R. (2003). Vendor Evaluation with performance variability: A max-min approach. European Journal of Operational Research, 146(3), 543-552.

Weber, C. A., Current, J. R., & Benton, W. C. (1991). Vendor Selection Criteria and Methods. European Journal of Operational Research, 50(1), 2-18.

Volume XIX, Issue (1) (2023) 466-473

International May Conference on Strategic Management

PREFERENCES OF YOUNG PEOPLE IN CREATING A FAMILY BUSINESS BY TYPES OF FAMILY TIES

Julia Murzina[1*], Konstantin Shokhov[1], Daniel Pavlov[2]

[1] University of Tyumen, Russia; [2] University of Ruse "Angel Kanchev", Bulgaria

Abstract: The growth of small business is one of the strategic directions of development for Russia. In modern conditions of foreign policy sanctions and instability, the development of small businesses can become a "national treasure". The study of the type of family ties and relationships within an entrepreneurial family is another important area for the development of small businesses. However, there is a lack of research on the variety of family relationships within a business family. The purpose of this paper is to investigate the preferences of young people in creating a family business by type of family ties. The present study was conducted as part of the INTERGEN project in 2021 and was based on data collected from students of the University of Tyumen, Russia and the University of Ruse, Bulgaria. The hypothesis: Young people prefer to create a family business with siblings. Statistical analysis partially confirmed the hypothesis: it is true for students of the University of Ruse, but not for students from the University of Tyumen, where young people prefer to run a family business with their parents. Thus, studying the preferences of young people in creating a family business can prevent family conflicts, maintain business and family cohesion.

Keywords: family business, family ties, family relationships, INTERGEN

1. INTRODUCTION

For Russia, the growth of small business is one of the strategic directions of development. At the end of 2018, the National Project "Small and Medium Enterprises and Support for Individual Entrepreneurial Initiatives" was launched. The main objective of the project is to diversify the Russian economy and bring the share of small businesses in the country's GDP to 32.5 percent. For these purposes, it was planned to organize large-scale work to promote entrepreneurship, and 2020 was declared as the "Year of the Entrepreneur" in the Russian Federation. However, this project did not address the topic of family business.

Five family business centres have been opened based on the Chamber of Commerce and Industry of the Russian Federation since 2021. The aims of their work are to study, support and develop family business in Russia. Today it becomes obvious that the scientific work on the study of family business is expected to help to develop the particular type of entrepreneurship and increase family income. That will contribute to the achievement of such a national goal as ensuring sustainable growth in real incomes of the population.

In modern conditions of foreign policy sanctions and financial instability, the strengthening and development of small business can become the same "national treasure" as the raw materials sectors of the economy (Aibyatova, 2011). The Small and Medium Business Activity Index in December 2022 turned out to be multidirectional: activity in medium business

[*] *Corresponding author: y.s.murzina@utmn.ru*

accelerated (+6.1), small business had slow growth (+1.3), microbusiness activity declined (0.0). However, we observe that this form of business is gradually recovering and continuing its development.

Small business development can be stimulated by financial, infrastructural, social and psychological factors. The study of the type of family ties and relationships within an entrepreneurial family is another important area for the development of small businesses. However, there is a lack of research on the variety of family relationships within a business family. The purpose of this paper is to investigate the preferences of young people in doing a family business by type of family ties (relationships with grandparents, or parents, or siblings, or children).

Moskovich and Achouch (2017) throw light on the complex family business culture which includes "development of human resources management, labour relations, working climate in business, health, safety, prosperity, fulfilment of regulatory requirements for employees, equal opportunities, and any other matter relating to the employment relationship, which goes beyond just the employees" (p.97). At this point, we realise the evolution of family business research goes beyond the formation of the business and toward the added complexities of familial ties. Specifically, our theoretical research is devoted to the study of the influence of the type of family ties on business.

Connecting family and business requires the ability to play roles in two different relationship contexts at the same time: as a family member and as a business member. Working with relatives gives rise to all sorts of problems (Greenhaus at al., 1985; Jaffee, 1990). So, Greenhaus at al. (1985) suggested that work-family conflict exists when: (a) time devoted to the requirements of one role makes it difficult to fulfil requirements of another, (b) strain from participation in one role makes it difficult to fulfil requirements of another; and (c) specific behaviours required by one role make it difficult to fulfil the requirements of another.

On the other hand, the family business creates a sense of pride for its members being a source of their livelihood, reflecting values and goals that builds a family's socio-emotional wealth. These non-financial aspects of the firm meet the family's affective needs, such as identity, the perpetuation of the family dynasty and reputation in public (Gómez Mejía et al., 2007; Block & Wagner, 2014; Lamb et al., 2017; Soleimanof et al., 2018).

Neubaum (2018) presented a framework to explain the complex interdependence and link between the family and business (Fig.1). In this model the author emphasised the interdependence, overlap and relatedness of the structures of family and business.

The concept of familiness acknowledges the importance of strong familial networks, both within and outside an organization that impact the goals and success of the family business (Ram & Edwards, 2003; Block & Wagner, 2014). Neubaum's concept captures how the family members get along with each other as their strong compatibility results in high commitment and extra-role behaviours.

Another important aspect of a family business has to do with ownership and transfer of ownership. If ownership in the business is concentrated on one descendant in each generation, a business family will remain a nuclear family – relatively small with modest complexity. But ownership tends to be passed relatively equally to children in each generation, meaning that as a business family extends over generations, it tends to grow in size and in family complexity. The single nuclear family of the first generation becomes a few nuclear families still connected to the original family, and then descendants organized in the branches of the second generation, and then sometimes organized into finer branch identities.

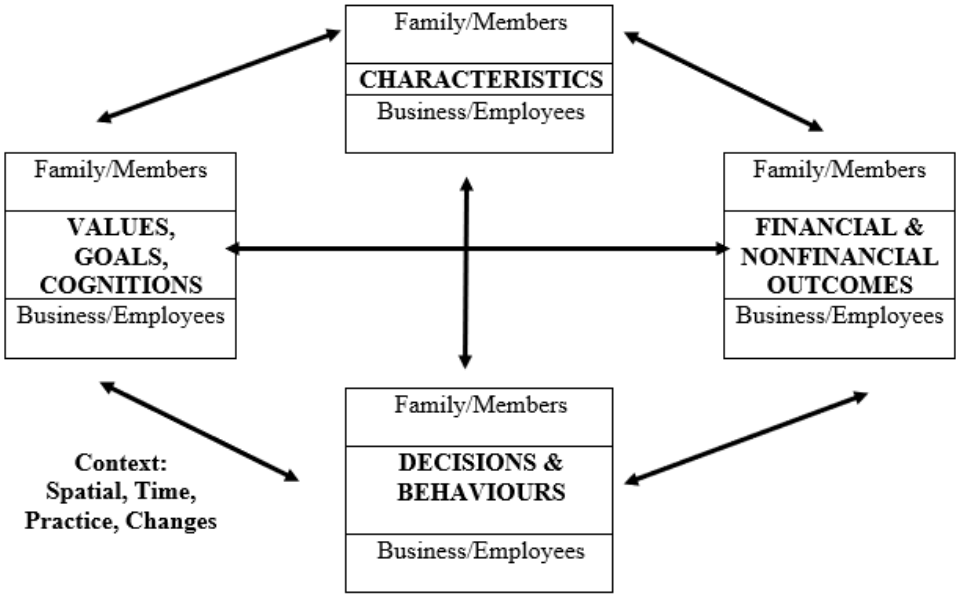


Figure 1. Framework for understanding the link between family and businesses (Neubaum, 2018)

This natural progression is captured in the family stages: nuclear family (or multiple nuclear families in Islamic culture), siblings and families, first cousins and families, distant cousins and families (often called a clan). A small number of family relationships expand to numerous types of family ties – parent-child, sibling, in-law, cousin, uncle-nephew, grandfather-granddaughter, and so on. A member of the business family will mostly be concerned about family life in his or her nuclear family, but because of business ties, this increasingly complex web of relationships assumes greater saliency.

Cole (2000) outlined that there are a lot of authors who warn against the confusing role of combining business and family relationships: the dual relationship of family member/business defeats most business families. It is too confusing to handle because the rules of one context are different from the other. But his research findings point to another side of that story. Most family members in this study found dual relationships rewarding in spite of the problems.

Siblings and spouses seemed to enjoy combining business and family the most. The one relationship that appeared to have problems is parent-child ties, particularly the relationship of a mother and young adult son. Perhaps, those differences, as Cole said, are based on the notion of generational hierarchy. In a parent-child relationship, the age difference introduces a more unequal set of circumstances. In many families, children remain children in their parents' eyes, no matter how old they are. On the opposite, a husband and wife as well as a brother and sister are often close in age; therefore, their relationship has a greater chance of operating within a context of equality.

Haberman (2007) investigated the interactions among father-daughter and father-son family business. As a result, the women in the father-son business experienced feelings of exclusion, incidents of higher conflict among family members. On the other hand, women in the father-daughter business experienced feelings of inclusion, resulting in lower conflict that created high levels of shared meaning, collaboration, and integration among family members. Danes (2006) examined tensions generated by business issues for 187 family business-owning

wives and husbands over a period of time. Family and business goal ranking identified the first priority goal of business owners (husbands) as positive reputation with customers and of wives (household managers) as good family relationships. The tension questions reflect the five conflict content areas of justice, role clarity, work/family balance, identity, and succession. Work/family and justice conflicts were the highest tension producers for both spouses in each time period.

Thus, the topic of the impact of family relations on business is often revealed in one aspect (role conflicts, human resources management, labour relations, working climate in business). The influence of the type of family ties on business is not well understood. This paper presents the results of a comparative empirical study of the readiness of young people in Russia and Bulgaria to create a business with relatives by different types of family ties. The main goal was to investigate the correlation between the internal need to do a family business and preferences of doing business with different types of relatives.

2. MATERIALS AND METHODS

The empirical basis of the study was the data obtained through a survey within the framework of the INTERGEN international project in 2021 (Bakracheva et al., 2020). The survey was conducted via e-mail or directly in face-to-face classes with undergraduate students. The questionnaire consisted of 56 general questions, including those fixing the socio-demographic characteristics of the students. The answers to each statement were given on a five-point Likert scale: “no”, “rather no”, “don't know”, “rather yes”, “yes”.

The sample from Russia was presented by 245 students of Tyumen State University (females - 199, males – 46), average age of the respondents - 23 years old. The sample from Bulgaria was presented by 288 students of "Angel Kanchev" University of Ruse (females -219, males – 69, average age of the respondents – 34,4 years old).

The hypothesis: Young people will prefer to build a family business with siblings.

In this study, the following question numbers from the Questionnaire were used:

29. I would like to do business with relatives.

45. Would you develop business relationships with at least one FIRST generation (grandparents)?

46. Would you develop business relationships with at least one SECOND generation (parents)?

47. Would you develop business relationships with at least one THIRD generation (siblings)?

48. Would you develop business relationships with at least one of your children?

The data were processed by methods of mathematical statistics using descriptive statistics methods, comparison of differences by Manna-Whitney test, Pearson's correlation analysis. The data were processed in the program Statistica 10.0.

3. RESULTS AND DISCUSSION

The level of family support was assessed using the question: "I am convinced that my family always supports me. According to the results of the survey, the majority of respondents have close relationships with their family members. Answers have an asymmetric arrangement: “rather yes” and “yes” answers dominate (Figure 2).

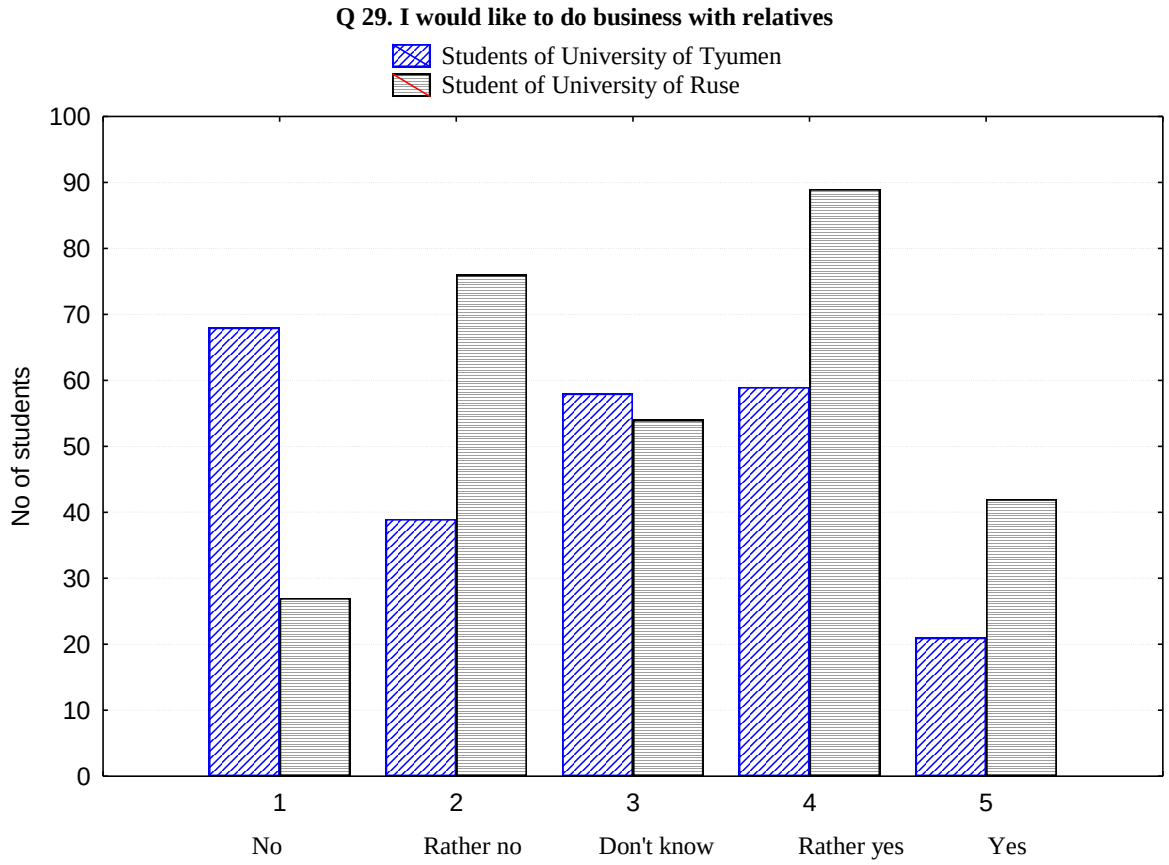


Figure 2. Histogram comparing the distribution of responses of two groups

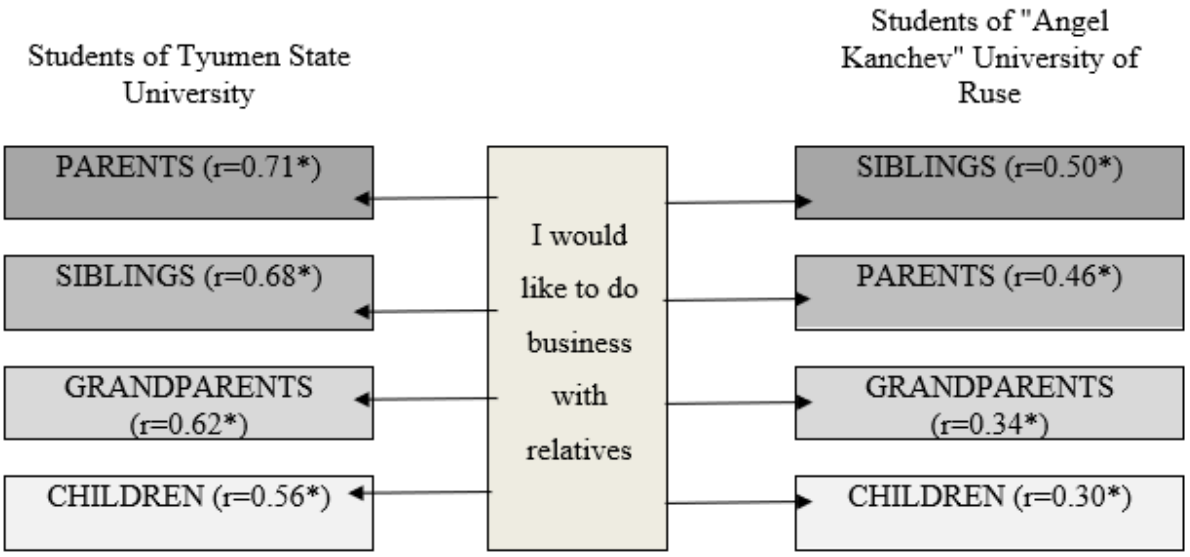
Students from Bulgaria are more willing to build a family business with relatives (Figure 2): 89 people indicated positive "rather yes", "yes" - 42 people). Thus, 45.5% of the total sample of students are ready to build a family business. In Russia the number of positive answers is significantly lower: 59 people gave positive answers "rather yes", "yes" - 21 people, which is 32.7% of the total sample. The significance of differences of the variable "Internal need to do business with relatives" is also confirmed by the nonparametric Mann-Whitney comparison criterion (Table 1).

To study the willingness to create a family business with other family members (grandparents, parents, siblings, children) we also compared the significance of differences of other variables using the Mann-Whitney test. According to Table 1, we can state the significance of differences of all these variables between students from Russia and Bulgaria.

Table 1. Evaluation of the significance of differences by the Mann-Whitney test between students of two universities from Russia and Bulgaria

I would like to do business with…	U	Z	p-level
relatives	28489	3,83	0,00
grandparents	30816	2,52	0,01
parents	26654	4,87	0,00
siblings	28936	3,58	0,00

Furthermore, we present the results of the Pearson's correlation analysis between the variable "Internal need to do a family business with relatives" and different types of family ties in business (Figure 3).



**Marked correlations are significant at p < ,0500*

Figure 3. Visualization of Pearson's correlation coefficient

In Fig. 3 we see that for students of the University of Tyumen there is a strong positive correlation between the wish to have a family business and the willingness to build it with their parents (r = 0.71). Next in terms of the degree of decrease in the strength of the correlation are relationships with brothers (r = 0.68), grandparents (r = 0.62) and children (r = 0.56).

For students of the University of Ruse, an average positive link between the internal need to have a family business and the willingness to build it with brothers and sisters (r=0.50) was revealed. Moreover, weak links with the willingness to build a business with parents (r=0.46), grandparents (r=0.34) and children (r=0.56) were revealed.

The preference to have a family business with parents for students from Russia can be explained by the fact that young people have a higher level of support in the family (Mean 4.39), while for students from the University of Ruse the level of family support is significantly lower (Mean 3.65) In our previous study, Spearman's rank correlation coefficient confirmed the relationship between the level of family support and the internal need to have a family business (Murzina & Pavlov, 2022).

It is interesting to note that students from the two countries are less likely to start a business with their children. Probably, these results are due to the absence of their own children. It can be assumed that future life and future children seem illusory and unrealistic to our respondents. Therefore, they express a low willingness to build a business with them. This may indicate an unformed time perspective of students: planning life only for a short period ahead. This topic was not the subject of this study, but the development of a time perspective in young people with long-term planning helps in life and professional self-determination, increases certainty in life.

Thus, the hypothesis "young people prefer to create a family business with siblings" is partially confirmed. To be more precise, the hypothesis is true only for students from the city of Russia. Students from Tyumen prefer to run a family business with their parents, despite the age differences and hierarchical relationships inherent in parent-child relationships.

4. CONCLUSIONS

Connecting the two roles from the family and business is a difficult task for family business participants. After all, in a limited time period, relatives must often fulfil the conflicting requirements of different social roles. The analysis of the literature has shown typical difficulties that can arise when imposing roles. However, we managed to find a different point of view. So, the advantages of a family business are family-collective psychological ownership, personal satisfaction, public reputation, socio-economic wealth, increasing employee motivation, commitment.

This paper presents the results of a comparative empirical study of the readiness of young people in Russia and Bulgaria to create a business with relatives by different types of family ties. We found out that the students of the University of Tyumen have the willingness to do business with their parents ($r = 0.71$), the students of the University of Ruse have the willingness to do business with siblings ($r=0.50$). We tend to explain this difference by the nature of family relationships: young people in Russia have a higher level of support in the family. At the same time, as our theoretical analysis shows, relationships in business, which is built with parents, are more conflictual. At the same time, business relationships with a spouse or siblings are built on equality, so they provoke fewer disagreements. Thus, statistical analysis partially confirmed the hypothesis: it is true for students of the University of Ruse, but not for students from the University of Tyumen.

We see the prospect of further research to study the causes of organizational and family conflicts in different types of family business and their prevention. Such scientific work will help to preserve family relationships (ties) and prolong the existence of the family business.

REFERENCES

Aibyatova, R. R. (2011). Small business as a basis for economic security in the period of financial instability. Bulletin of the Kazan State Agrarian University. V. 6. 2(20), 11-13. (in Russian)

Bakracheva, M., Pavlov, D., Gudkov, A., Diaconescu, A., Kostov, A., Deneva, A., Kume, A., Wójcik-Karpacz, A., Zagorcheva, D., Zhelezova-Mindizova, D., Dedkova, E., Haska, E., Stanimirov, E., Strauti, G., Taucean, I., Jovanović, I., Karpacz, J., Ciurea, J., Rudawska, J., Ivascu, L., Milos, L., Venera, M., Sheresheva, M., Tamasila, M., Veličković, M., Damyanova, S., Demyen, S., Kume, V., & Blazheva, V. (2020). The intergenerational family businesses as a stress management instrument for entrepreneurs (Volume 1). The Intergenerational Family Businesses as a Stress Management Instrument for Entrepreneurs (2020). Ruse: University of Ruse "Angel Kanchev".

Block, J. H., & Wagner, M. (2014). The effect of family ownership on different dimensions of corporate social responsibility: Evidence from large US firms. Business Strategy and the Environment, 23(7), 475-492.

Cole, P. M. (2000). Understanding Family Business Relationships: Preserving the Family in the Business. The Family Journal, 8(4), 351–359.

Danes, S. M. (2006). Tensions within family business-owning couples over time. Stress, Trauma, and Crisis, 9(3-4), 227-246.

Gómez-Mejía, L. R., Haynes, K. T., Núñez-Nickel, M., Jacobson, K. J., & Moyano-Fuentes, J. (2007). Socioemotional wealth and business risks in family-controlled firms: Evidence from Spanish olive oil mills. Administrative science quarterly, 52(1), 106-137.

Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. Academy of management review, 10(1), 76-88.

Haberman, H., & Danes, S. M. (2007). Father-daughter and father-son family business management transfer comparison: Family FIRO model application. Family Business Review, 20(2), 163–184.

Hedberg, P. R., & Danes, S. M. (2012). Explorations of dynamic power processes within copreneurial couples. Journal of Family Business Strategy, 3(4), 228-238.

Jaffee, D. T. (1990). Working with the ones you love: Conflict resolution & problem solving strategies for a successful family business. Berkeley: Conari Press.

Lamb, N. H., Butler, F., & Roundy, P. (2017). Family firms and corporate social responsibility: exploring "concerns". Journal of Strategy and Management, 10(4), 469-487.

Moskovich, Y., & Achouch, Y. (2017). Family home culture and management-employee relationships: Comparing two kibbutz factories. Journal of Co-operative Organization and Management, 5(2), 95-107.

Murzina J., & Pavlov D. (2022). Psychological support within the family as a factor stimulating the development of family business. In: International May Conference on Strategic Management – IMCSM22, Serbia, BOR, 2022, 377-382.

Neubaum, D. O. (2018). Family Business Research: Roads Travelled and the Search for Unworn Paths. Family Business Review, 31(3), 259-270.

Ram, M., & Edwards, P. (2003). Praising Caesar not burying him: what we know about employment relations in small firms. Work, employment and society, 17(4), 719-730.

Soleimanof, S., Rutherford, M. W., & Webb, J. W. (2018). The intersection of family firms and institutional contexts: A review and agenda for future research. Family Business Review, 31(1), 32-53.

Volume XIX, Issue (1) (2023) 474-479

International May Conference on Strategic Management

ENTREPRENEURIAL AWARENESS AND INTENTIONS TO HAVE A FAMILY BUSINESS

Svetlana Shvab[1*], Julia Murzina[1*], Daniel Pavlov[2]

[1] University of Tyumen, Russia; [2]University of Ruse "Angel Kanchev", Bulgaria

Abstract: This paper analyzes the relationship between entrepreneurial awareness and the intention of students to start a family business. The study was based on the survey of Russian and Bulgarian university students, conducted as part of the INTERGEN project in 2021. We performed correlational analysis using the Statistica 8.0 software package and revealed a moderate correlation between entrepreneurial intentions and the desire to learn more about the opportunity to start a neoclassical multigenerational family business. There is a direct correlation between intentions to start a family business and the need for information about how to interact with relatives when starting a neoclassical multigenerational family business with them. Additionally, a moderate correlation was recorded between the intention to start a business with relatives and knowledge of examples of successful family businesses in the country for students from Bulgaria. For the sample from Russia, the correlation coefficient is weak.

Keywords: entrepreneurial intention, awareness, family business

1. INTRODUCTION

Family business plays an important role in the economic and social development of the world. More than two-thirds of all global enterprises are owned and supported by family firms, which account for about half of the total gross domestic product (Shanker & Astrachan, 1996). Approximately 90% of all enterprises in Canada and the USA are considered family businesses. 75% of UK companies and 95% of German businesses are family-run. Family business is also increasingly significant in India (Gabriel & Bitsch, 2018).

Due to the historical peculiarities of economic development in Russia, family business setup is hindered by institutional, mental, demographic and economic barriers. In this regard, the identification of phenomena and processes that contribute to the development of family business is one of the priorities.

Family entrepreneurship usually differs from other forms in strategy and organization, as well as the participation of family members in business planning, decision-making, control, and management (Chua et al., 1999).

Balancing family and business activities in family entrepreneurship is not an easy task for modern family enterprises (Karataş-Ozkan et al., 2011; Zachary, 2011).

On the one hand, family economic relations have a number of advantages. Some young people stay in their regions away from capital cities, pay taxes to local budgets, which seek to improve the quality of life in the regions. The joint work of the spouses affects the relationship

[*] *Corresponding author: y.s.murzina@utmn.ru*

in the family, contributes to marriage survival. Moreover, the older generation has the opportunity to live next to their family (Pavlov et al., 2017).

On the other hand, owner-managers face the challenge of balancing responsibility for both the family and the family business, which involves family interaction, time and energy. Conflicts within the family, with relatives and non-family workers often cause tension in the business (Frank et al., 2011).

The lack of training in family entrepreneurship creates difficulties in managing a family business for both the family and employees. There is a research gap on the education market in terms of how to help family entrepreneurs learn to harmonize family relationships, strategic business decision making, and shareholder opinion. The need for courses and training on the basics of family entrepreneurship was caused by the focus of educational programs on traditional business.

Today, the main social institutions for supporting intergenerational entrepreneurship are the education system, family, mass and media communications, government bodies. They have an impact on social attitudes and behavioral intentions (Bandura, 2011; Pavlov et al., 2017).

Universities support young people in creating a business by providing human capital assets such as relevant knowledge, necessary skills and competencies, psychological qualities, understanding of the entrepreneurial spirit and motivation for development in the field of entrepreneurship. Moreover, they build social capital through acquaintance with entrepreneurs, investors and service providers (Davidsson, 2003).

The study of the intentions of university students to start a family business after graduation is important for strategic planning and regulating the labor market, developing targeted programs and educational products for potential entrepreneurs, understanding the mechanisms for increasing the level of entrepreneurial activity. Entrepreneurial intentions are a key factor in predicting a person's entrepreneurial behavior, reflecting the degree to which people are motivated and willing to make efforts to implement such behavior (Krueger et al., 2000).

Significant factors in the formation of students' entrepreneurial intentions are the university environment and specialized business courses, practical business games, trainings and fairs. Technological clusters, business incubators and business communities involved in creating conditions and infrastructural support for business start-ups should take into account the level of the population's entrepreneurial intentions in general and family entrepreneurial intentions in particular. (Ljubanenko, 2018).

In this regard, the development of entrepreneurial educational programs at universities and their connection with the intentions of young people to run their own business is attracting more and more attention of scientists (Souitaris at al., 2007; Fayolle & Gaily, 2015; Shirokova et al., 2015).

Large-scale international projects GUESSS (Global University Entrepreneurial Student’s Spirit Survey) and InterGen (The intergenerational family businesses as a stress management instrument for entrepreneurs), national research groups survey the entrepreneurial intentions of students and the factors that contribute to the formation of students’ intentions to set up their own business (Bakracheva et al., 2020; GUESSS, 2021).

2. MATERIALS AND METHODS

Based on the analysis of student entrepreneurial intentions, we formulated hypothesis H1: There is a significant positive relationship between the intention to have a family business and awareness of family entrepreneurship.

This empirical study was conducted within the framework of the InterGen project aimed at revealing the characteristics of family entrepreneurship in different countries and examining students' attitude to building a joint business with relatives.

We carried out the survey to identify the intentions of young men and women from Russia and Bulgaria to have a family business. 243 students at the University of Tyumen (Russia) and 288 students at the Angel Kanchev University of Ruse (Bulgaria) took part in the survey in 2021. 21.5 percent of respondents from the total sample were men, 78.5 percent - women.

The city of Tyumen is located in the leading oil and gas-producing region of Western Siberia. While the city of Ruse is the largest port and industrial city in Bulgaria, a country of the European Union. Thus, the selected universities are located in politically, economically and culturally diverse countries, but are of great importance for regional economies.

Students' attitude towards family business has been measured through a 5-point Likert self-report scale, including the following options: "strongly disagree", "rather disagree", "don't know", "rather agree", "strongly agree".

The study gives priority to the next specific questions:

Question №29. I would like to have a family business with my relatives.

Question №35. I know examples of successful multigenerational family enterprises in my country.

Question №36. I need more information on opportunities to start a neoclassical multigenerational family business.

Question № 37. I would like to learn more about how to interact with my relatives when I start a neoclassical multigenerational family business with them.

Statistical analysis was performed using the Statistica 8.0 software package. We applied Spearman's rank correlation coefficient to identify the relationship between the variables and Mann-Whitney U-test to determine the significance of differences.

3. RESULTS AND DISCUSSION

The outcomes of our empirical study support the view that entrepreneurial awareness affects entrepreneurial intentions (Luo & Chong, 2019). Table 1 presents the results of the correlation analysis that measured the relationship between the intention to have a family business and family business awareness.

Table 1. Correlation between the intention to have a family business and family business awareness

Question	I would like to have a family business with my relatives	
	Russia	Bulgaria
I know examples of successful multigenerational family enterprises in my country	0,22*	0,30*
I need more information on opportunities to start a neoclassical multigenerational family business	0,38*	0,34*
I would like to learn more about how to interact with my relatives when I start a neoclassical multigenerational family business with them	0,55*	0,40*

*Marked correlations are significant at $p < ,0500$.

We found a direct moderate correlation between the intention to have a family business and the need to learn more about the opportunity to start a neoclassical multigenerational family

business as well as the desire to learn more about how to interact with relatives when starting a neoclassical multigenerational family business with them.

There is a direct moderate correlation between the intention to have a family business and knowledge of examples of successful family businesses in the country for students from Bulgaria (correlation coefficient = 0.30). For the sample from Russia, the correlation coefficient is weak (0.22).

In addition to the correlation analysis, we conducted the non-parametric Mann-Whitney U-test in order to identify significant differences in entrepreneurial awareness of students from Russia and Bulgaria. The results of the comparison of samples are presented in Table 2.

Table 2. Comparison of samples by Mann-Whitney U-test

Question	U	Z	p-level	Z	p-level	N Russia	N Bulgaria
I know examples of successful multigenerational family enterprises in my country	25376,00*	5,46	0,00	-5,60	0,00	243	288
I need more information on opportunities to start a neoclassical multigenerational family business	27044,50*	-4,51	0,00	-4,67	0,00	243	288
I would like to learn more about how to interact with my relatives when I start a neoclassical multigenerational family business with them	24633.50*	-5,88	0,00	-6,06	0,00	243	288

Students from the University of Ruse were more likely to answer that they knew examples of successful multigenerational family businesses in their country (Mean 3.64), than students from the University of Tyumen (Mean 2.93).

Additionally, students from the Bulgarian university were more inclined to receive information about the opportunities of building a fam ily business (Mean 3.76) and how to interact with relatives when building a family business (Mean 3.75) than Russian students (Mean 3.18 and 3.01, respectively).

The data show that students from Russia know little about examples of successful family businesses in their own country. This is probably the reason why they did not state their willingness to create this type of business with their family members. As a result, students from the University of Tyumen did not express the necessity for additional information on family entrepreneurship.

At the same time, the higher the interest of young people in starting a family business is, the more they want to receive information about the rules and forms of intergenerational interaction (0.55).

Low family entrepreneurship awareness among Russian students can be explained by the fact, that being a historically traditional form of doing business in Russia, family entrepreneurship was eliminated in the 20th century. Therefore, the focal point of educational programs and info media landscape is classical entrepreneurship.

However, the "Development of family business in Russia" project currently brings together all the entities of the Russian Federation, dozens of territorial chambers of commerce and industry, thousands of entrepreneurs. The Chamber of Commerce and Industry of the

Russian Federation, together with the State Duma and the Government of Russia, are working on a federal law on Family Business, which will make it possible to separate family companies into a separate legal category and to give them special preferences.

4. CONCLUSIONS

Thus, studying the attitude of university students to the creation of a family business after graduation is important for the assessment of entrepreneurial potential, strategic planning and regulation of the region's labor market.

The analysis of entrepreneurial intentions and awareness revealed the necessity for designing successful family entrepreneurship policies. Educational institutions, departments of education and economics, associations of entrepreneurs need to develop programs for enhancing entrepreneurial skills and competencies at all levels of education: secondary, secondary professional, higher; and to identify groups of students with entrepreneurial potential.

Furthermore, promoting information about family business through the media and social networks, creation of special information programs, news stories, and discussions of topics on talk shows can help reveal the essence and advantages of the family form of entrepreneurship, activate the interest of young people in this form of business and contribute to its development. For the competent development of social and contextual advertising, the correct choice of the target audience, and a clear understanding of the needs and attitudes of the population is essential.

REFERENCES

Bakracheva, M., Pavlov, D., Gudkov, A., Sheresheva, M., Tamasila, M. et al. (2020). The intergenerational family businesses as a stress management instrument for entrepreneurs (Volume 1). The Intergenerational Family Businesses as a Stress Management Instrument for Entrepreneurs (2020). Ruse: University of Ruse “Angel Kanchev”.

Bandura, A. (2001) Social Cognitive Theory of Mass Communication. Media Psychology, 3, 265-299.

Chamber of Commerce and Industry of Russia https://smolenskcci.ru/category/item/3707-cci-of-the-russian-federation-the-nizhny-novgorod-region-has-adopted-russia-s-first-law-on-family-entrepreneurship (date of access 16.01.2023).

Chua, J. H., Chrisman, J. J., & Sharma, P. (1999). Defining the family business by behavior. Entrepreneurship theory and practice, 23(4), 19-39.

Davidsson, P., & Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. Journal of business venturing, 18(3), 301-331.

Fayolle, A., & Gailly, B. (2015). The impact of entrepreneurship education on entrepreneurial attitudes and intention: Hysteresis and persistence. Journal of small business management, 53(1), 75-93.

Frank, H., Kessler, A., Nosé, L., & Suchy, D. (2011). Conflicts in family firms: state of the art and perspectives for future research. Journal of Family Business Management, 2, 130-153.

Gabriel, A., & Bitsch, V. (2019). Impacts of succession in family business: A systemic approach for understanding dynamic effects in horticultural retail companies in Germany. Journal of Small Business and Enterprise Development, 26(3), 304-324.

Global University Entrepreneurial Spirit Student's Survey. Retrieved from: https://www.guesssurvey.org/resources/PDF_InterReports/GUESSS_2021_Global_Report.pdf (Accessed on March 20, 2023).

Karataş-Özkan, M., Nicolopoulou, K., İnal, G., & Özbilgin, M. (2011). Cross-cultural perspectives of diversity within family businesses. International Journal of Cross Cultural Management, 11(2), 107-111.

Krueger Jr, N. F., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. Journal of business venturing, 15(5-6), 411-432.

Ljubanenko A. V. (2018). Entrepreneurial education as a factor in the development of the regional economy. Regional problems of economic transformation, 5 (91), 43-48. (in Russian)

Luo, B., & Chong, T. T. L. (2019). Regional differences in self-employment in China. Small Business Economics, 53, 813-837.

Pavlov, D., Sheresheva, M., & Perello, M. (2017). The intergenerational small family enterprises as strategic entities for the future of the european civilization-a point of view. Journal of entrepreneurship & innovation, 9(9), 26-38.

Shanker, M. C., & Astrachan, J. H. (1996). Myths and realities: Family businesses' contribution to the US economy—A framework for assessing family business statistics. Family business review, 9(2), 107-123.

Shirokova G. V., Cukanova T. V., & Bogatyreva K. A. (2015). Factors in the formation of entrepreneurial intentions of Russian students // Bulletin of St. Petersburg University. Management, 3, 21-46. (in Russian)

Souitaris, V., Zerbinati, S., & Al-Laham, A. (2007). Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. Journal of Business venturing, 22(4), 566-591.

Zachary, R. K. (2011). The importance of the family system in family business. Journal of Family Business Management, 1(1), 26-36.

Volume XIX, Issue (1) (2023) 480-489

International May Conference on Strategic Management

DIGITAL COMMUNICATION, PERSONAL VALUES AND THE Z GENERATION

Zsuzsanna Deák*

Óbuda University, Keleti Károly Faculty, Hungary

Abstract: The relationship between technological change and cultural change has long been a matter of debate. The present study began to address these issues by doing a preliminary data analysis from the latest round of the European Social Survey (ESS Round 10). The study finds that there are significant differences in values, based on the Schwartz taxonomy, between GenZ and earlier generations. Additionally, attitudes toward digital communication, differ mainly on the positive aspects, that is GenZ believes it brings people closer and it makes coordinating and managing activities easier where older generations feel more strongly that it undermines personal privacy. On the dangers of misinformation and that digital communication is encroaching on personal life all generations seem to agree. Lastly, the study looked at communication patterns, that is which channels of communication are preferred by the members of Generation Z, and found that in general GenZ communication is a lot less intensive with their parents even when it comes to digital communication, whereas, in a workplace setting they prefer more digital means of communication compared to prior generations.

Keywords: Generation z, digital communication, personal values

1. INTRODUCTION

Research devoted to the study of generations builds on the work of Howe and Strauss (1991) who proposed a classification of generations and argued that each generation has specific cultural characteristics. Generally, there are five different generations identified in the modern world:

a) The Greatest or Silent Generation (often considered two separate groups), was born between 1928 and 1944, they value authority and a top-down management approach,

b) The Baby Boomer Generation, born between 1945 and 1964 tend to be workaholics,

c) Generation X, born between 1965 and 1979, is a generation who is comfortable with authority and view work-life balance as important,

d) Generation Y, or the Millenials were born between 1980 and 1994 and generally grew up in prosperity and are technology savvy,

e) Generation Z, born after 1995 tend to be digital natives, fast decision makers, and highly connected (Cilliers, 2017).

The sixth group being Generation Alpha succeeded GenZ starting from the early 2010's. They are the first generation to be born entirely in the 21st century.

* *Corresponding author: deak.zsuzsanna@uni-obuda.hu*

Gen Zers are currently between the age of ten and thirty, depending on whose definition is used. They have also been called “Digital Natives,” the “Internet Generation” (IGen) or Zoomers. The quintessential member of Generation Z was the first generation to be born into a world that was globally interconnected, so they "live and breathe" technology. They have never experienced life without the Internet or mobile phones. Generation Z students in the higher education setting rely on powerpoints and videos rather than taking notes, are more likely to ask questions online, expect lecturers to entertain them, dislike waiting for a response, and expect instant information and communication (Rothman, 2016). According to some research, Generation Z's brains are structurally different from those of previous generations, not due to genetic changes, but rather how our brains react to the stimuli of the external environment (Rothman, 2016). Digital technology, according Small and Vorgan, has profoundly changed how we think and act, affecting both our social and cognitive worlds (2008).

With the advent of this first fully digital generation, the exact process of how new ethical norms emerge and existing ones erode has been thrust to the forefront. The goal of this study is to shed light on the value preferences of generation Z and how members of this generation view and practice digital communication.

1.1. Theoretical background

The term "phygital" (physical plus digital) refers to the blending of digital and physical experiences. Younger people are less likely to separate events in the real and virtual worlds. This is a defining trait of generation Z, which does not distinguish between the real world and the virtual world and does not consider itself to exist outside of the phygital environment. In 2007, Chris Weil of the advertising firm Momentum Worldwide coined the term "phygital." The practice of describing the inextricable links between the physical and digital worlds is common in the consulting, strategy, analytics, and experience design fields (Vergine et al., 2019).

For the first time in history, the children of today are more competent, knowledgeable and educated than their parents in the areas of innovation that play a crucial role in society. This is accomplished by utilizing digital media, which the "online generation" will keep developing and integrating into general society's culture. Compared to their parents, these kids now learn, play, communicate, collaborate, and form social bonds in different ways. The upcoming social transformation will be driven by them (Tapscott, 2008). Due to the strong intergenerational gap created by this paradoxical situation, Generation Z prefers to interact with their peers. It is challenging for Generation Z to adopt generally accepted norms and values because of this compartmentalization.

From the classical sociological tradition arose the concept of anomie, or normlessness, which describes the breakdown and ambiguity of societal norms that regulate individual behavior. Durkheim (1897) posited that this could occur when a society is undergoing rapid social change and people are no longer certain of what social norms and values are. With no countervailing social solidarity values to temper the emphasis on individual satisfaction at the expense of others, individualism-dominated societies also exhibit this normlessness. Because they have not yet developed strong value systems, young people are often the ones most exposed to conditions of anomie. The anomie brought on by the digital environment is what this study is most interested in.

Ten distinct types of values, recognized across cultures and operationalized in the Human Values Scale, were identified by Schwartz (1992) and are as follows: conformity, tradition, benevolence, universalism, self-direction, stimulation, hedonism, achievement,

power, and security. Additionally, because the ten values are interconnected, it is possible to combine items from values that are motivationally similar to create more accurate measures of broader value orientations. Moving up a level values theory can be simplified into four higher-order value orientations: conservation, openness to change, self-enhancement, and self-transcendence (Fig. 1).

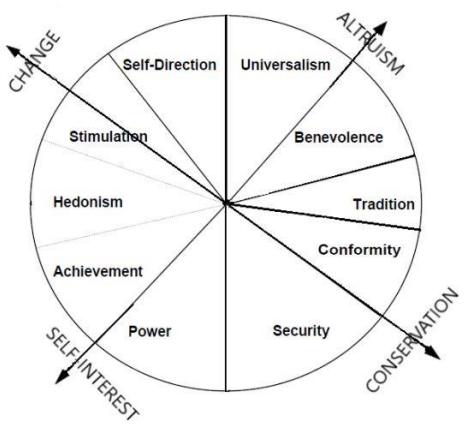


Figure 1. Human values scale (based on Davidov et al., 2009)

The following section presents the methodology and the data together with the types of analysis, while the results section reveals the justifications for the research hypotheses.

2. MATERIALS AND METHODS

This paper uses data from the European Social Survey (ESS) collected between September 2020 and August 2022 across 25 European countries. The European Social Survey is a biennial survey of social attitudes and behavior which has been carried out in up to 36 European countries since 2001. The survey addresses persons aged 15 and over, therefore covers the Z generation only partially (those born before 2007). Only data from version 2.2 was used as the self administered version 1.1 (which was introduced due to Covid) did not include the human values portion. Thus, the countries included in the study are: Bulgaria (BG), Czech Republic (CZ), Estonia (EE), Finland (FI), France (FR), Greece (GR), Croatia (HR), Hungary (HU), Iceland (IS), Italy (IT), Lithuania (LT), Netherlands (NL), Norway (NO), Portugal (PT), Switzerland (CH), Slovenia (SI) and Slovakia (SK). The data for each country consists of a representative sample of the adult population (ESS Round 10, 2020).

The survey contained 6 attitudes questions about online/mobile communication (three positive and three negative). These were:

Online/mobile communication makes people feel closer to one another
Online/mobile communication makes it easy to coordinate and manage activities
Online/mobile communication makes it easy to work from home or place of choice
Online/mobile communication undermines personal privacy
Online/mobile communication makes work and personal life interrupt each other
Online/mobile communication exposes people to misinformation

Respondents were also asked how they communicate with people. There were three sets of groups: their children aged 12 or older, their parents and their co-workers. The survey did

not ask about friends or other acquaintances. Communication type included traditional face-to-face and by telephone, and digital such as messaging, email or text and screen-time.

Additionally, of particular interest for this paper, the survey also gauges respondents' value system, that is what issues do they consider important in life. There are twenty-one questions regarding human values which can be seen in Table 1. The responses were rated on a 6-point ordinal scale, with 1 denoting "very much like me" and 6 denoting "not like me at all". Responses were arranged into sets that corresponded to the fundamental concepts put forth by Schwartz (1992, 2005).

Table 1. The 21 Human Value Scale questions

Behave properly	Be successful, recognized for achievements	Seek adventures, have an exciting life
Show abilities and be admired	People treated equally, have equal opportunities	Live in secure, safe surroundings
Get respect from others	Be loyal to friends, devoted to people close	Care for nature and environment
Try new and different things	Government be strong and ensure safety	Make own decisions and be free
Do what is told, follow rules	Be humble & modest, not draw attention	Think new ideas and be creative
Understand different people	Help people, care for others well-being	Follow traditions and customs
Have a good time	Seek fun and things that give pleasure	Be rich, have expensive things

For general analyses all the responses were valid, while further analyses required data cleaning. Responses with missing data were dealt with for the specific questions. In Table 2, the demographic profile of respondents is reported.

Table 2. Demographic profile of respondents

	N	Mean	Median	SD	Min	Max
Age						
Gen Z (1995-2006)	3803	21.13	12	3.2224	15	27
Gen Y (1980-1994)	6419	34.73	35	4.3043	26	44
Gen X (1965-1979)	7879	49.42	50	4.3052	41	57
Boomers (1945-1964)	9866	66.07	66	5.6349	56	77
Pre-War (1931-1944)	2389	81.91	81	3.7325	76	90

Based on the literature review and the questions available in the ESS survey, three hypotheses were formulated:

H1: There are significant differences in Values between GenZ and earlier generations

H2: There are significant differences in Attitudes toward digital communication between GenZ and earlier generations

H3: There are significant differences in how GenZ communicates compared to earlier generations

For analysis, the non-parametric Mann-Whitney U test was selected to be run in SPSS. Mann-Whitney U Test is one of the most reliable tests for Likert scale under two categorical variables (Derrick & White, 2017).

3. RESULTS

3.1. Generation Z value system

As it can be seen on Figure 2, the results reflect quite closely some of the previous research findings. GenZ-ers place less value on tradition and conformity while stimulation is much more important for them. Somewhat surprisingly though, they are not at all more

altruistic than previous generations, on the contrary they prize hedonistic values, personal achievement and power more. Making their own decisions is also important, while they do not differ in their expectations about security.

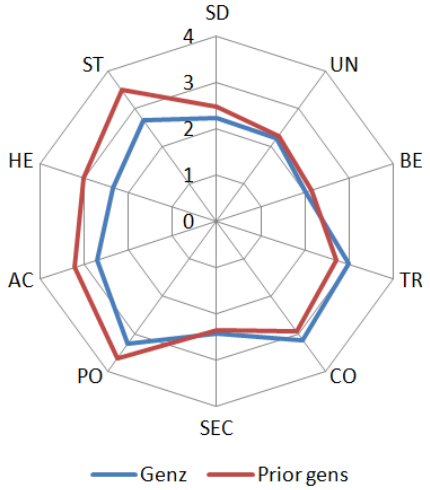


Figure 2. Mean scores of Human Values Scale, GenZ vs. Previous generations
(1 Very much like me --- 6 Not like me at all)

A Mann-Whitney U test was performed to evaluate if human values differ significantly by generation (Table 3). While all results were significant, Benevolence, Universalism and Security differed the least.

Table 3. Mann Whitney U test results for Human Value Scales

		N	Mean Rank	Mann Whitney Sig. (2-tailed)	Z-score
ST	Prior Gens	26334	15790.97		
	GenZ	3776	9926.29	.000	-39.058
SD	Prior Gens	26371	15354.59		
	GenZ	3779	13127.89	.000	-14.897
HE	Prior Gens	26321	15707.34		
	GenZ	3775	10454.74	.000	-35.048
PO	Prior Gens	26355	15420.64		
	GenZ	3777	12595.42	.000	-18.832
AC	Prior Gens	26302	15499.18		
	GenZ	3769	11803.69	.000	-24.622
SEC	Prior Gens	26345	14968.64		
	GenZ	3776	15705.39	.000	-4.932
CO	Prior Gens	26328	14839.69		
	GenZ	3776	16536.32	.000	-11.331
TR	Prior Gens	26355	14783.52		
	GenZ	3777	17041.08	.000	-15.08
UN	Prior Gens	26379	15171.01		
	GenZ	3780	14444.89	.000	-4.836
BE	Prior Gens	26342	15220.07		
	GenZ	3778	13947.9	.000	-8.569

3.2. Generation Z attitude toward digital communication

Next, attitudes toward the effects of digital communication was investigated. Gen Z respondents felt much stronger that digital communication brings people closer. Interestingly, the negative connotations associated with digital communication (loss of privacy, spreading of misinformation or interference with private life) are shared equally by all generations. And while GenZers believe that digital communication makes coordinating and managing activities easier, they agree less with the statement that it makes it easy to work from home or place of choice. This might be due to the fact, that a rather large portion of this generation in the sample is not working yet (2094 out of 3803 respondents), so this result maybe misleading.

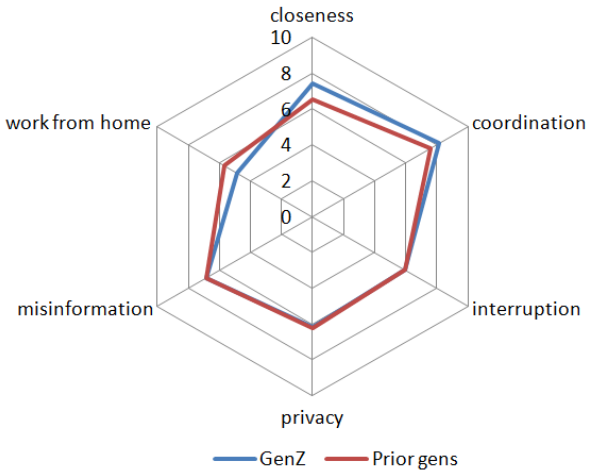


Figure 3. Mean scores of Attitudes, GenZ vs. Previous generations
(0 Not at all --- 10 Completely)

A Mann-Whitney U test was performed to evaluate whether attitudes toward digital communication's effect differed significantly by generation (Table 4). The results confirmed the above that Zoomers believe more so that mobile communication makes people feel closer to one another than prior generations ($z = -20.228$, $p < .001$). In the negative effects associated with mobile communication, only personal privacy differed significantly ($z = -2.290$, $p = .022$) between generations, where older generations feel more strongly that it undermines personal privacy.

Table 4. Mann Whitney U test results for Attitudes toward on line communication

On line communication makes ….	N	Mean Rank	Mann Whitney Sig. (2-tailed)	Z-score
people feel closer				
prior gens	25475	14242		
genz	3768	17193	.000	-20.228
easy to coordinate and manage activities				
prior gens	25173	14159		
genz	3756	16517	.000	-16.421
easy to work from home or place of choice				
prior gens	11407	6418		
genz	1266	5610	.000	-7.542
work and personal life interrupt each other				
prior gens	22790	13088		
genz	3360	12994	.498	-0.678
undermines personal privacy				
prior gens	25205	14515		
genz	3739	14183	.022	-2.290
exposes people to misinformation				
prior gens	25016	14354		
genz	3750	14582	.113	-1.584

3.3. Generation Z modes of communication

In this section, communication patterns were looked at. The two groups examined were parents and co-workers. Communication with child over 12 years old is not comparable, since Zoomers are not old enough yet to have children of this age.

Not surprisingly GenZ communicates lot less with their parents through all the communication channels.

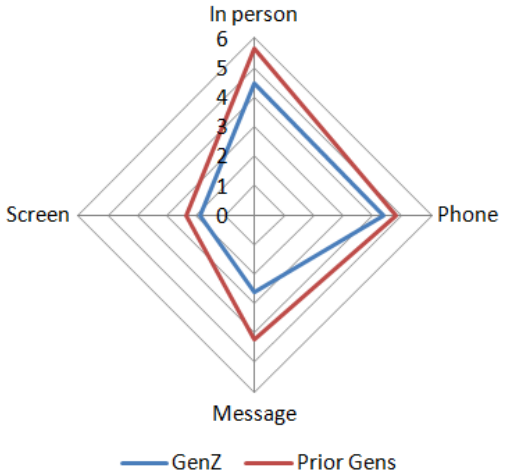


Figure 4. Mean scores of Communication with parents, GenZ vs. Previous generations (1 never --- 7 Several times a day)

Again a Mann-Whitney U test was performed to evaluate whether communication patterns differed significantly by generation (Table 5). For all questions the results were

significant (< . 001), showing that there are significant differences in communication patterns with parents among generations.

Table 5. Mann Whitney U test results for Communication with parents

Communication with parents		N	Mean Rank	Mann Whitney Sig. (2-tailed)	Z-score
In person					
	prior gens	13518	9313.51		
	genz	3662	5921.55	.000	-37.422
On the phone					
	prior gens	13526	8820.88		
	genz	3655	7740.27	.000	-11.99
Message, text, email					
	prior gens	13512	9406.22		
	genz	3659	5557.08	.000	-43.362
Screentime					
	prior gens	13510	8931.53		
	genz	3658	7302.82	.000	-20.175

As far as communicating with co-workers, at first look there seems to be no differences in face-to-face or on the phone communication in the workplace (Fig 5.).

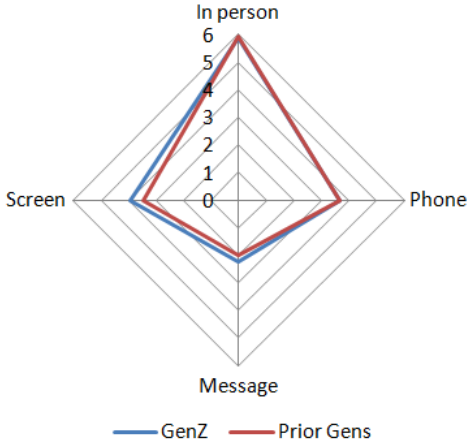


Figure 5. Mean scores of Communication with co-workers, GenZ vs. Previous generations
(1 Several times a day--- 7 Never)

After, running the Mann-Whitney test, only two of the results were significant, messaging and screen-time (Table 6). Again, as previously, it is worth mentioning that a large portion of GenZers are not working yet, or have limited work experience, so this result might be fallacious.

Table 6. Mann Whitney U test results for Communication with co-workers

Communication with coworkers		N	Mean Rank	Mann Whitney Sig. (2-tailed)	Z-score
In person					
	prior gens	13133	7329		
	genz	1533	7372.2	.677	-0.417
On the phone					
	prior gens	13095	7307.2		
	genz	1520	7315	.944	-0.070
Message, text, email					
	prior gens	13117	7269.7		
	genz	1530	7789.3	.000	-5.101
Screentime					
	prior gens	13086	7206.7		
	genz	1522	8145.7	.000	-8.353

4. CONCLUSIONS

The relationship between technological change and cultural change has long been a matter of debate. The present study began to address these issues by doing a preliminary data analysis from the latest round of the European Social Survey (ESS Round 10). There were three hypothesis set up. The first hypothesis of GenZ having different values was proven to be true for all of Schwartz's major Human Value Scales. The second hypothesis held true only partially, namely all the positive connotations associated with digital communication were significantly different, but only one of the negative ones: personal privacy. On the dangers of misinformation and that digital communication is encroaching on personal life all generations seem to agree. The last hypothesis could also be confirmed in regards to communicating with parents, as GenZ-ers are a lot less active in this sense even when it comes to digital communication. Whereas, in a workplace setting they prefer more digital means of communication.

4.1. Limitations and future research

The current study looks at European population as a whole, and it does not differentiate between countries, or regions. Earlier studies using data from ESS Round 8 have also examined the differences between various European countries (Błoński, 2017) which will be a future aim of this research. Additionally, a longitudinal view of shifting values systems could be of interest, comparing current result with previous ESS rounds, especially considering the effects of the pandemic on digitalization and inter-social relations. As there are some questions about causality – could the internet affect human values, or is it human values, that effect technology diffusion – (Blekesaune, 2019), longitudinal studies are of great importance.

REFERENCES

Blekesaune, M. (2019). Can 'Openness-to-change'and 'Conservation'Values Predict the Diffusion of the Internet into European Homes? Comparative Sociology, 18(5-6), 735-756.

Błoński, K. (2017). Generational Segmentation in Selected European Countries-Analysis of Secondary Data. Bucharest 2017, 163.

Burton-Jones, A., & Hubona, G. S. (2005). Individual differences and use behavior: Revisiting a technology acceptance model assumption. The DATA BASE for Advances in Information Systems, 36(2), 58–77.

Cilliers, E. J. (2017). The Challenge of Teaching Generation Z. People. International Journal of Social Sciences, 3(1), 188–198.

Davidov, E., Schmidt, P., & Schwartz, S. (2009). Bringing Values Back In: The Adequacy of the European Social Survey to Measure Values in 20 Countries. Public Opinion Quarterly, 72(3), 420-445.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340.

Derrick, B., & White, P. (2017). Comparing two samples from an individual Likert question. International Journal of Mathematics and Statistics, 18(3).

Durkheim, E. (1897). Suicide: A Study in Sociology. New York: The Free Press.

ESS Round 10: European Social Survey Round 10 Data (2020). Data file edition 1.2. Sikt - Norwegian Agency for Shared Services in Education and Research, Norway – Data Archive and distributor of ESS data for ESS ERIC. doi:10.21338/NSD-ESS10-2020.

Rothman, D. (2016). A tsunami of learners called generation Z. Retrieved from http://mdle.net/Journal/A_Tsunami_of_Learners_Called_Generation_Z.pdf

Schwartz, S. H. (1992). Universals in the content and structure of values: Theory and empirical tests in 20 countries. In M. Zanna (Ed.), Advances in experimental social psychology (Vol. 25) pp. 1–65. New York: Academic Press.

Schwartz, S. H. (2005). Basic human values: Their content and structure across countries. In: A. Tamayo, J. B. Porto (Eds.), Valores e comportamento nas organizações [Values and behavior in organizations], Vozes, Petrópolis, Brazil.

Small, G. W., & Vorgan, G. (2008). iBrain: Surviving the Technological Alteration of the Modern Mind, New York: HarperCollins Publisher.

Strauss, W., & Howe, N. (1991). Generations: The History of America's Future, 1584 to 2069. New York: William Morrow and Company Inc.

Tapscott, D. (2008). Grown up Digital: How the Net Generation is Changing Your World. New York: McGraw-Hill.

Vergine, I., Brivio, E., Fabbri, T., Gaggioli, A., Leoni, G., & Galimberti, C. (2019). Introducing and implementing phygital at work. Studi Organizzativi, 2, 137–163.

Volume XIX, Issue (1) (2023) 490-500

International May Conference on Strategic Management

IMPACT OF ORGANIZATIONAL CULTURE ON WORK ENGAGEMENT OF UNIVERSITY TEACHERS IN THE REPUBLIC OF SERBIA: A PILOT STUDY

Biljana Đorđević*, Ivana Simić, Sandra Milanović

University of Niš, Faculty of Economics, Republic of Serbia

Abstract: The subject of this paper is an investigation of the influence of organizational culture (OC) on university teachers' work engagement (WE). The aim of the paper is to find out whether OC at universities has a significant positive influence on teachers' WE as well as to investigate the relationship between different types of OC at universities and their WE. For the purpose of the paper, a pilot study was conducted. The sample included 110 respondents from faculties at the University of Belgrade. The research results showed that OC has a positive and significant influence on the university teachers' WE, with the hierarchical type having the strongest positive influence. The contribution of the paper is that it enriches the literature in the field of investigation of the relationship between OC and WE in a university context as well as stresses the importance of OC as a driver of individual, organizational, and academic performance.

Keywords: work engagement, organizational culture, university teachers

1. INTRODUCTION

Although it has been popular for more than 3.5 decades (Bailey et al., 2015, p. 1), the concept of WE is still a work in progress. It is not only due to the lack of a unique theoretical approach to the WE phenomenon, the absence of a standardized method of measuring it (Bailey et al., 2015, p. 1), or the evident evolution that the workforce inevitably undergoes (Swanberg et al., 2011, p. 613), but also to the fact that certain topics related to work engagement, as a variable significant for the organization's competitive advantage (Corporate Leadership Council, 2004; Rich et al., 2010, p. 617) and its business outcomes (Swanberg et al., 2011, p. 613), have yet to be researched. One such topic is OC and its impact on employee engagement.

Although the results of one global study, involving 50,000 employees at 59 global organizations around the world, have shown that the top 25 drivers of engagement belong to one out of three relevant groups, of which one is OC (Corporate Leadership Council, 2004, p. 13), a number of other studies examining the impact of OC on employee engagement are still limited (Naidoo & Martins, 2014, p. 433). The situation is even worse when it comes to researching the relationship between OC and WE in higher education institutions. To the best of our knowledge, no such research has been conducted in the Republic of Serbia so far. That was the primary motive of the authors of this paper to do a pilot study on the influence of OC on university teachers' WE in the Republic of Serbia. Therefore, in the paper, after a theoretical

* *Corresponding author: biljana.djordjevic@eknfak.ni.ac.rs*

background on OC and WE in a university context and the hypotheses development, the obtained results of the study are presented and discussed. At the end of the paper are the concluding remarks.

2. THEORETICAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1. Work Engagement at the University Level

The engagement of employees is a theme that, in the last few decades, has received substantial attention from both scientists and practitioners. This theme in the literature was introduced by Kahn (1990) through the concept of the personnel engagement. However, lately, many other terms for this phenomenon have emerged, such as "work engagement" (Schaufeli et al., 2002), "job engagement" (Rich et al., 2010), or "organizational engagement" (Ruck et al., 2017). Although there is an opinion that among these different terms there is no big difference (Alnuaimi, 2022), literature suggests that the most frequent term for describing the phenomenon of employee engagement is the term introduced by Schaufeli et al. (2002), "work engagement". Schaufeli et al. (2006) defined it as "a positive, fulfilling, work-related state of mind that is characterized by vigour, dedication, and absorption" (Schaufeli et al., 2006, p. 702). In their conceptualization of employee engagement, vigour refers to the energy, mental resilience, and persistence of the employees; dedication refers to the sense of significance, enthusiasm, inspiration, and pride in the job; and absorption refers to working in a state of complete concentration on one's work (Schaufeli et al., 2002).

Because of the perceived importance that WE have for the attitudes and behaviours of employees (Motyka, 2018), and consequently their performance (Khan et al., 2014), some of the research in the previous period focused on the investigation of the WE of university teachers and other employees in the educational sector. Certain studies have shown that higher levels of university teachers` WE contribute to their professional development (Lyons, 2006, cit. in Zhang, 2021), students' physical and mental growth, academic performance (Ruzek, 2012, cit. in Zhang et al., 2021), organizational citizenship behaviours, innovative behaviours (Konermann, 2012), a higher level of job satisfaction (Høigaard et al., 2012), as well as their job performance (Sittar, 2020).

Factors affecting WE were also the subject of attention of certain researchers (Crawford, et al., 2013; Addimando, 2019; Zhang et al., 2021; Alnuaimi, 2022; Ljubetić et al., 2022). However, the number of studies examining the effect of OC on WE is still limited. Even more limited are those studies in which this relationship is examined in the example of universities.

2.2. Organizational Culture in the University Context

As "a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" (Schein, 2004, p. 17) or an established way of thinking and working in an institution, which includes its policies, rules, and procedures, its customs and practices, it's shared values and belief systems, its traditions and assumptions, and the character of the language used to communicate (Jaques & Clement, 1994, p. 266), the OC has been the subject of interest of a number of organizational researchers and managers for several decades (compare with Schein, 2004, p. 7). The increased interest in OC is primarily the consequence of the recognized importance that OC has for the functioning of organizations and for the achieved results (Tsai, 2011; Shahzad et al., 2012).

In addition to studying OC in a different environment, researchers and practitioners are also focusing their attention on specific types of organizations; precisely, on the impacts that culture within particular organizational contexts have on various aspects of the organizational functioning (compare with Fralinger & Olson, 2007, p. 85). Universities, as institutions of higher (or tertiary) education, are just one of those specific organizations.

The study of OC at universities began in the 1960s (Smerek, 2010, p. 381). A large number of studies conducted so far have shown that OC affects various aspects of university functioning and success, including university management, working life, and employees' behaviour (Smerek, 2010, p. 381; Coman & Bonciu, 2016, p. 136; Beytekin et al., 2010, p. 1). It also impacts employee attitudes and organizational effectiveness (Thien, 2020, p. 59; Smart & St. John, 1996; Smart, 2003), as well as university structure and development (Lacatus, 2013, p. 422) etc.

Ryan E. Smerek emphasizes that although OC in the context of higher education has been studied using various conceptual models and frameworks (e.g., Competing Values Framework - CVF, Case Studies conceptual model, Schein's Three Levels of Culture/framework; Faculty differentiation; Administrative versus faculty subcultures; Studies using multiple perspectives, etc.), they can be grouped into three perspectives: integration, differentiation, and fragmentation (Smerek, 2010, p. 409). According to Smerek, there is a clear heavier focus of researchers on the integration perspective (Smerek, 2010, p. 409) while "the most widely-used conceptual models of culture in higher education is the Competing Values Framework" (Smerek, 2010, p. 389).

The Competing Values Framework, initially created by Quinn and Rohrbaugh (1983), was later refined by Cameron and Quinn (2006). The Framework was based on two dimensions: focus (internal orientation, integration, and unity vs. external orientation, differentiation, and rivalry) and structure (flexibility, discretion, and dynamism vs. stability, order, and control). By combining them, a four-cell matrix was obtained within which Cameron and Quinn (2006) identified four types of organizational culture: *clan* (employee development, collaboration, teamwork, participation, loyalty, trust, open communication, commitment to employees, and work engagement), *adhocracy* (innovativeness, autonomy, creativity, variety of tasks, challenging and stimulating work), *hierarchy* (focus is on efficiency, formal rules, policies and procedures, stability, and control), and *market* (competitiveness and aggressiveness, result and achievement orientation, etc.). These types of organizational culture, as well as the entire Competing Values Framework, were used by Cameron and Quinn (2006) to create the Organizational Culture Assessment Instrument (OCA), which is a widely applicable instrument for diagnosing OC.

2.3. Hypothesis Development

Apart from the aforementioned global study (*Corporate Leadership Council*, 2004) that indicates the connection between OC and WE, there are several other studies that have investigated the relationship between OC and WE so far. In most of them, a positive relationship was found (Naidoo & Martins, 2014; Ilyasa & Ramly, 2018; Hasan et al., 2020; Putri et al., 2021).

Although limited, a certain number of studies have investigated the relationship between OC and the WE of employees at universities and high schools. In the study conducted by Abbas (2017) on the sample of faculty and administrative staff of Karakoram International University in Pakistan, it was found that OC significantly affects employee engagement. Further, Arifin et al. (2017) found that OC relates positively to the WE of teachers in high schools in Jakarta.

Having in mind the above, the first hypothesis that is going to be tested in the paper is as follows:

H1: OC has a significant positive influence on the WE of university teachers in the Republic of Serbia.

Some of the studies conducted in the previous period focused on the investigation of the impact of different types of OC on WE, where the above-mentioned typology of organizational cultures proposed by Cameron and Quinn (2006) (clan cultures, adhocracy cultures, hierarchy cultures, and market cultures) was used. Those studies were conducted in various sectors, including education.

In the non-educational sector, significant positive relationship between clan culture and WE were found in the studies conducted by Bakker et al. (2008) and Crawford et al. (2010), while partly significant results for a positive relationship between this type of culture and WE were found in the study conducted by Krog (2014). In the education sector, a significant positive relationship between clan culture and WE were found in the study conducted by Afrifa et al. (2022) on a sample of employees at higher education institutions in Ghana. Based on the above, the second hypothesis that is going to be tested in the paper is:

H2: Clan cultures are positively related to the work engagement of university teachers in the Republic of Serbia.

When it comes to the adhocracy culture, a significant positive relationship between this type of culture and WE has been found in certain studies (Hackman & Oldham, 1976; Bakker et al., 2008; Crawford et al., 2010). In the study conducted in the education sector by Afrifa et al. (2022), a positive influence of this type of OC on WE was also found, although an insignificant one. Hence, the third hypothesis that is going to be tested in the paper is as follows:

H3: Adhocracy culture is positively related to the WE of university teachers in the Republic of Serbia.

When it comes to the investigation of the relationship between characteristics of market culture and WE, the results of certain studies show a negative relationship (Krog, 2014). Therefore, the fourth hypothesis that is going to be tested in the paper is as follows:

H4: Market culture is negatively related to the WE of university teachers in the Republic of Serbia.

Studies that have investigated the relationship between characteristics of hierarchical culture and WE have mostly found a positive relationship. In the study conducted by Reis et al. (2016), a moderately positive relationship was found between this type of culture and employee WE, while in the education sector, Afrifa et al. (2022) found a positive relationship between this type of culture and employee WE. Therefore, the fifth hypothesis that is going to be tested in the paper is as follows:

H5: Hierarchical culture is positively related to the WE of university teachers in the Republic of Serbia.

3. METHODOLOGY OF RESEARCH

3.1. Context of the research and the sample

In the Republic of Serbia, there are nine state-owned universities, among which the University of Belgrade is the largest with 31 faculties. That is the reason why this University has been chosen to be the sample frame for this research. In this pilot study that been conducted, the researchers targeted only teaching staff (i.e., full professors, associated professors and assistant professors). The respondents, 110 of them, were invited to participate in this research through institutional emails and the anonymity of their answers was granted by the researchers.

The surveying process was performed from November 2022 to January 2023. The researchers distributed the survey through the online tool *Google Forms*. The emails were resent after one month to all teachers as a reminder to take part in this survey.

As the sample consists of 110 faculty teachers, the structure of respondents is diverse when it comes to the job title and faculty that this professor works with. The responses were received from teachers from eight faculties: the Faculty of Economics (15), the Faculty of Law (3), the Faculty of Security (6), the Faculty of Political Science (9), the Faculty of Philosophy (19), the Faculty of Veterinary Medicine (9), the Faculty of Physics (11), and the Faculty of Agriculture, which had the highest response (38 responses).

Table 1. Sample structure by academic title (Authors' calculation)

Characteristic		**N**	**%**
Title	Full professor	57	51.8
	Associate professor	27	24.5
	Assistant professor	26	23.6
	Total	110	100

3.2. Measurements

The questionnaire consists of three parts. The first set of questions is aimed at determining respondents' demographic characteristics. The second and the third part are devoted to assessing the OC of the faculty and, the WE of faculty teachers. For the OC measurement, OC Assessment Instrument (OCAI) was implemented (Cameron & Quinn, 2006). The questionnaire was adapted to measure only the existing OC because the current OC affects the current WE. For every type of culture (i.e., clan, adhocracy, market, and hierarchy), six items were used. The respondents assessed the statements on a 5-point Likert scale from totally disagree to totally agree. For example, one statement adapted to Serbian and used in the survey is "The organization is a very controlled and structured place. Formal procedures generally govern what people do." WE was measured using the Utreht WE scale - UWES-9. This scale is aimed at the evaluation of vigour, devotion, and absorption (Seppälä et al., 2009). Nine items, separated into three segments, were used to measure respondents' levels of work involvement, and then graded on a 7-point Likert scale (1 = never to 7 = always). For instance, the question "I get carried away when I'm working" has been used. All variables explored have satisfactory reliability measured by Cronbach alpha's coefficient (Table 2). The questionnaire was double translated from English to Serbian and reversely in order to retain the adequate focus.

3.3. Statistical analysis

The Statistical Package for Social Sciences (SPSS), version 23, was used to apply the appropriate statistical procedures to the data obtained from the responses to the study questionnaire. The study report used descriptive statistics such as means, frequencies, and standard deviations to address the research topics. The reliability of the data in this study is evaluated using Cronbach's alpha coefficient where cut-off point accepted is 0.7 (Field, 2013). The study report used bivariate correlation and simple regression to assess the research hypotheses. For that purpose, the study has tested five models.

4. ANALYSIS AND DISCUSSION

4.1. Research results

The following table represents a descriptive statistic of the researched variables such as types of OC and WE.

The results from Table 2 indicate that the highest mean value among OC types has hierarchy culture (mean = 3.197, SD = .822) and clan culture (mean = 3.024, SD = .912). That is above the average values of these variables since the average level is 3. Generally, OC has a mean of 4.542 (SD = .752). The WE of respondents is measured to be under the average value of 4 or 3.947 (SD = .619).

Table 2. Descriptive statistic (Authors' calculation)

Variable	Minimum	Maximum	Mean	Standard deviation	Cronbach alpha
Organisational culture	1.000	4.542	2.945	.752	.957
Clan culture	1.000	5.000	3.024	.912	.899
Adhocracy culture	1.000	4.500	2.803	.842	.894
Market culture	1.000	4.500	2.756	.785	.885
Hierarchy culture	1.000	4.833	3.197	.822	.846
Work engagement	1.000	5.000	3.947	.619	.891

Table 3 represents the results of the conducted test of bivariate correlations to assess the relationship between independent and dependent variables and to be a signal for multicollinearity issues of the model. The results show that WE is positively related to all types of OC, i.e. clan ($r = .211$, $p \leq .05$), adhocracy ($r = .232$, $p \leq .05$), market ($r = .251$, $p \leq .01$), and hierarchy ($r = .323$, $p \leq .01$), as well as positive correlation between OC and WE is noted ($r = .283$, $p \leq .01$).

Table 3: Bivariate correlations

Variable	N	1	2	3	4	5	6
1. Organisational Culture	110	1					1
2. Clan culture	110	.901**	1				
3. Adhocracy culture	110	.928**	.818**	1			
4. Market culture	110	.881**	.659**	.814**	1		
5. Hierarchy culture	110	.866**	.717**	.684**	.704**	1	
6. Work engagement	110	.283**	.211*	.232*	.251**	.323**	1

Note: Significance at 5% is indicated by *, and 1% is indicated by **. All significance tests are two-tailed.

4.2. Hypotheses testing

For the purpose of assessing hypotheses, five models were created. The results of the linear regression analysis of these models are presented in Table 4, where OC or one type of OC are used as independent variables, while WE is used as a dependent variable. Firstly, the assumptions of regression analysis as a parametric test were checked.

Model 1: In order to test the first hypothesis, the first model is created. The results indicate that the OC has a positive influence on the WE of respondents ($\beta = .194$, $p \leq .01$). The model is statistically significant ($F = 9.404$, $p \leq .01$). This further indicates that the 8% of WE is explained by the change in the OC. Therefore, hypothesis H1 is confirmed.

Model 2: In order to test the second hypothesis, the second model was created. The results indicate that the clan culture has a positive influence on the WE of respondents ($\beta = .143$, $p \leq .05$). The model is statistically significant ($F = 5.053$, $p \leq .05$). This further indicates that the

4.5% of WE is explained by the change in the clan culture. Therefore, hypothesis H2 is confirmed.

Model 3: The third model is designed to test the third hypothesis. The results indicate that the adhocracy culture has a positive influence on the WE of respondents ($\beta = .171$, $p \leq .05$). The model is statistically significant ($F = 6.156$, $p \leq .05$). This further indicates that the 5.4% of WE is explained by the change in the adhocracy culture. Therefore, hypothesis H3 is supported.

Model 4: The fourth model tests the fourth research hypothesis. The results indicate that the market culture has a positive influence on the WE of respondents ($\beta = .198$, $p \leq .01$). The model is statistically significant ($F = 7.267$, $p \leq .01$). This further indicates that the 6.3% of WE is explained by the change in the market culture. The fourth hypothesis is not supported and therefore it is rejected.

Model 5: The last hypothesis is tested using the fifth model. The results indicate that the hierarchy culture has a positive influence on the WE of respondents ($\beta = .243$, $p \leq .01$). The model is statistically significant ($F = 12.576$, $p \leq .01$). This further indicates that the 10.4% of WE is explained by the change in the hierarchy culture. This hypothesis is accepted and the regression coefficient indicates the highest influence of hierarchy culture on WE.

Table 4: Linear regression results – types of OC as predictors (Authors' calculation)

Variable	*Dependent variable: Work engagement*				
	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Constant	3.261***	3.514***	3.469***	3.402***	3.170***
Independent variable					
Organisational culture	.194**				
Clan culture		.143*			
Adhocracy culture			.171*		
Market culture				.198**	
Hierarchy culture					.243**
R square	.080	.045	.054	.063	.104
Adjusted R square	.072	.036	.045	.054	.096
R square change	.080**	.045*	.054*	.063**	.104**
F statistics	9.404**	5.053*	6.156*	7.267**	12.576

Note: Significance at the 5% is indicated by *; at the 1% is indicated by **; at the 0.1% is indicated by ***

4.3. Discussion

This study's findings pointed out the positive influence of OC generally and of all OC types on the WE of teaching staff. The study results also showed that the hierarchy type of OC (focus on effectiveness, formal regulations, laws, regulations, etc.), is the most prominent among other types of OC at faculties of Belgrade University, as well as that it has the most significant positive influence on teachers' WE. This could be explained by the high Uncertainty Avoidance Index (92), which is a general characteristic of national culture in Serbia (Hofstede, 2001), as well as the fact that employees in a hierarchy culture feel obligated to work hard and give their best because of the values of efficiency and uniformity (Afrifa et al., 2022). When compared to the results of similar studies, the findings are mostly in line. Significant positive influences of clan as well as hierarchy culture were also found in the study conducted by Afrifa et al. (2022). Moreover, in their study, they captured the highest regression coefficient for the hierarchy culture as well. Their study also confirmed a positive relationship between adhocracy culture and WE, although an insignificant one.

5. CONCLUSION

This paper dealt with the investigation of the influence of OC on the WE of university teachers in the Republic of Serbia. The results of the pilot study that has been conducted, showed that OC in general as well as all types of OC have a significant positive impact on their WE. However, this paper is not without limitations. The first limitation refers to the fact that conclusions are drawn based on a pilot study in which the sample consisted of 110 respondents. The second limitation refers to the fact that in the survey, only university teachers from one university (although the biggest one in the Republic of Serbia) took part. The third limitation refers to the fact that only the perceived OC of university teachers was investigated, while in the survey other university employees (administrative staff and assistants) did not take part.

Despite the above limitations, the paper has several contributions: it enriches the literature in the field of investigation of the relationship between OC and WE in the university context; it enriches the domestic literature in the field of investigation of the relationship between OC and WE in general; and further, it stresses the importance of OC as a driver of university teachers' engagement. This indicates the necessity of paying more attention to OC at universities, both in the Republic of Serbia and in general.

Although the continuation of the started research will indicate the character of the OC at other faculties and universities in the Republic of Serbia, as well as its impact on the WE of other university employees, the obtained results can serve as a framework for the faculties' management to become more attentive to the OC on their faculties and, hence, the WE of academic and administrative staff.

ACKNOWLEDGEMENT

This research is part of the 101059994 – UR-DATA - HORIZON-WIDERA-2021-ACCESS-02 project, funded by the European Union.

REFERENCES

Abbas, M. (2017). The Effect of Organizational Culture and Leadership Style towards Employee Engagement and Their Impact towards Employee Loyalty. Asian Journal of Technology and Management Research, 7(2), 1-11.

Addimando, L. (2019). The effect of positive working conditions on work engagement and teaching classroom practices: A large cross-sectional study in Switzerland. Frontiers in Psychology, 10, 21-29.

Afrifa Jnr, S., Fianko, K. S., Amoah, N., & Dzogbewu, Th. C. (2022). The Effect of Organizational Culture on Employee Work Engagement in a Higher Education Institution. Organizational Cultures: An International Journal, 22(2), 89-104.

Alnuaimi, Y. M. A. (2022). Impacts of Workplace Factors on Employee Engagement in the Public Sector. European Journal of Marketing and Economics, 5(1), 57-70.

Arifin, F., Troena, E. A., & Rahayu, D. M. (2014). Organizational Culture, Transformational Leadership, Work Engagement and Teacher's Performance: Test of a Model. International Journal of Education and Research, 2(1), 1-14.

Bailey, C., Madden, A., Alfes, K., & Fletcher, L. (2015). The Meaning, Antecedents and Outcomes of Employee Engagement: A Narrative Synthesis. International Journal of Management Reviews, 1-23.

Bakker, A. B., & Demerouti, E. (2008). Towards a Model of Work Engagement. Career Development International, 13(3), 209-223.

Beytekin, O. F., Yalcinkaya, M., Dogan, M., & Karakoc, N. (2010). The Organizational Culture at The University. International Journal of Educational Researchers, 1(2), 1-13.

Cameron, K. S., & Quinn, R. E. (2006). Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework, (revised edition). San Francisco: Jossey-Bass.

Coman, A., & Bonciu, C. (2016). Organizational Culture in Higher Education: Learning from the Best. European Journal of Social Sciences Education and Research, 3(1), 135-145.

Corporate Leadership Council (2004). Driving Performance and Retention Through Employee Engagement. Available at: https://www.stcloudstate.edu/. (April 20, 2023).

Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. Journal of Applied Psychology, 95, 834-848.

Crawford, E. R., Rich, B. L., Buckman, B., & Bergeron, J. (2013). The antecedents and drivers of employee engagement. In Employee engagement in theory and practice (pp. 71-95). Routledge.

Field, A. (2013). Discovering statistics using IBM SPSS statistics. London: Sage Publications.

Fralinger, B., & Olson, V. (2007). Organizational Culture at The University Level: A Study Using the OCAI Instrument. Journal of College Teaching & Learning, 4(11), 85-97.

Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. Organizational Behavior and Human Performance, 16, 250-279.

Hasan, H., Astuti, E. S., Wulida T., &. Iqbal, M. (2020). Impact of Organizational Culture on Employee Engagement and Employee Performance: A Stimuli-Organism-Response Approach. Wacana, 23(4), 235-247.

Hofstede, G. (2001). Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations, Thousand Oaks, CA: SAGE Publications.

Høigaard, R., Giske, R., & Sundsli, K. (2012). Newly qualified teachers' work engagement and teacher efficacy influences job satisfaction, burnout, and the intention to quit. European Journal of Teacher Education, 35(3), 347-357.

Ilyasa, M., & Ramly, M. (2018). The Effect of Organization Culture, Knowledge Sharing and Employee Engagement on Employee Work Innovation. International Journal of Scientific Research and Management, 6(1), 57-63.

Jaques, E., & Clement, S. D. (1994). Executive Leadership: A Practice Guide to Managing Complexity. Wiley-Blackwell.

Kahn, W. A. (1990). Psychological Conditions of Personal Engagement and Disengagement at Work. Academy of Management Journal, 33, 692-724.

Khan, I., Dongping, H., & Ghauri, T. A. (2014). Impact of attitude on employees performance: a study of the textile industry in Punjab, Pakistan. World Applied Sciences Journal, 30(1), 191-197.

Konermann, J. (2012). Teachers' work engagement: a deeper understanding of the role of job and personal resources in relation to work engagement, its antecedents, and its outcomes. PhD thesis. University of Twente Research Information.

Krog, A. K. (2014). The relationship between organizational culture and work engagement: A multilevel investigation. Retrieved from: https://www.duo.uio.no/ on April 19, 2023.

Lacatus, M. L. (2013). Organizational culture in contemporary university. Procedia-Social and Behavioral Sciences, 76, 421-425.

Ljubetić, M., Maglica, T., & Reić Ercegovac, T. (2022). Teachers' work engagement: the contribution of demographic, work-related, and social factors. Journal of the Institute for Educational Research, 54(1), 83-101.

Lyons, N. (2006). Reflective engagement as professional development in the lives of university teachers. Teach. Teach, 12, 151-168.

Motyka, B. (2018). Employee Engagement and Performance: A systematic literature review. International Journal of Management and Economics, 54(3), 227-244.

Naidoo, P., & Martins, N. (2014). Investigating the relationship between organizational culture and work engagement. Problems and Perspectives in Management, 12(4), 433-441.

Putri, N. E., Nimran, U., Rahardjo, K., & Wilopo, W. (2021). The Impact of Organizational Culture on Employee Engagement and Organizational Citizenship Behavior. In International Conference on Economics, Business, Social, and Humanities (ICEBSH 2021) (pp. 456-463). Atlantis Press.

Quinn, R. E., & Rohrbaugh, J. (1983). A Spatial Model of Effectiveness Criteria: Toward a Competing Values Approach to Organizational Analysis. Management Science, 29, 363-377.

Reis, G., Trullen, J., & Story, J (2016). Perceived organizational culture and engagement: the mediating role of authenticity. Journal of Managerial Psychology, 31(6), 1091-1105.

Rich, B. L., Lepine, J. A., & Crawford, E. R. (2010). Job Engagement: Antecedents and Effects on Job Performance. Academy of Management Journal, 53(3), 617-635.

Ruck, K., Welch, M., & Menara, B. (2017). Employee voice: An antecedent to organisational engagement? Public Relations Review, 43(5), 904-914.

Ruzek, E. A. (2012). Student motivation and academic achievement: an examination of how and why middle school teachers matter. dissertation. Irvine: University of California.

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a brief questionnaire: A cross-national study. Educational and Psychological Measurement, 66, 701-716.

Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. Journal of Happiness Studies, 3, 71-92.

Schein, E. H. (2004). Organizational culture and leadership. San Francisco: Jossey-Bass A Wiley Imprint.

Seppälä, P., Mauno, S., Feldt, T., Hakanen, J., Kinnunen, U., Tolvanen, A., & Schaufeli, W. (2009). The construct validity of the Utrecht Work Engagement Scale: Multisample and longitudinal evidence. Journal of Happiness Studies, 10, 459-481.

Shahzad, F., Luqman, R. A., Khan, A. R., & Shabbir, L. (2012). Impact of Organizational Culture on Organizational Performances: An Overview. Interdisciplinary Journal of Contemporary Research in Business, 3(9), 975-985.

Sittar, K. (2020). Relationship of Work Engagements and Job Performance of University Teachers Bulletin of Education and Research, 42(1), 167-183.

Smart, J. C., & St. John, E. P. (1996). Organizational culture and effectiveness in higher education: A test of the "culture type" and "strong culture" hypothesis. Educational Evaluation and Policy Analysis, 18(3), 219-241.

Smart, J. C. (2003). Organizational effectiveness of 2-year colleges: the centrality of cultural and leadership complexity. Research in Higher Education, 44(6), 673-703.

Smerek, R. E. (2010). Cultural Perspectives of Academia: Toward a Model of Cultural Complexity. In: Smart J. C. (ed.), Higher Education: Handbook of Theory and Research, 25, (381-423).

Swanberg, J. E., McKechnie, S. P., Ojha, M. U., & James, J. B. (2011). Schedule control, supervisor support and work engagement: A winning combination for workers in hourly jobs? Journal of Vocational Behavior, 79, 613-624.

Thien, N. H. (2020). Exploring the organizational culture of higher education institutions in Vietnam from the faculty's perspective-a case study. Journal of International and Comparative Education, 9(2), 59-76.

Tsai, Y. (2011). Relationship between organizational culture, leadership behaviour and job satisfaction. BMC health services research, 11(1), 1-9.

Zhang, D, He, J., & Fu, D. (2021). How Can We Improve Teacher's Work Engagement? Based on Chinese Experiences. Front. Psychol., 12, 721450.

Volume XIX, Issue (1) (2023) 501-509

International May Conference on Strategic Management

ENTREPRENEURSHIP, WOMEN, RURAL TOURISM AND DYNAMIC CAPABILITIES: A SYSTEMATIC REVIEW

Jose Antonio Gonzalez Cerezo, Ana Belén Mudarra Fernández*, Elia García Martí

University of Jaen, Spain

Abstract: The importance of rural tourism in the country's economy is currently very high, as it allows the diversification of the components of rural economies that would otherwise be doomed to disappear. It also makes it possible to maintain, protect and even enhance the heritage and cultural assets of these communities. In this study, a systematic review of the literature on entrepreneurship, women, dynamic capacities, gender and rural tourism will be carried out. This systematic review will be carried out using the WOS and Scopus databases. Once an exhaustive search has been carried out, the articles that do not fit our study will be discarded and, based on the studies accepted after the previous step, an analysis of their quality will be carried out to determine whether there is sufficient literature on these topics and to be able to draw conclusions or lines of work. Within this review, we will assess whether it is necessary to expand the literature or whether the existing literature is adequate in this field.

Keywords: gender, rural tourism, entrepreneurship, dynamic capabilities, women

1. INTRODUCTION

At present, due to the crisis generated by the Covid-19 pandemic, among other factors, in all economic sectors and more specifically in the tourism sector, we find ourselves in an increasingly complex, dynamic and knowledge-based environment. This has meant that, despite the fact that women are becoming more and more educated, they are finding it difficult to develop their professional activity within the tourism sector. This raises the question of the relationship between women and the tourism sector, in addition to the well-known kellys. As this sector is very broad and seeing the synergies between SDGs such as decent work with the maintenance of the environment, the main objective of this study is to determine the different lines of work that have been carried out up to 2021 in the field of women, entrepreneurship, rural tourism and dynamic capacities.

Taking into consideration the different search variables of this research, it should be noted that entrepreneurship is the process of pursuing an opportunity regardless of the resources controlled by the entrepreneur (Stevenson & Jarillo, 2002). The origin of the word entrepreneurship comes from the French word entrepreneur, which means to initiate something or to be willing to make decisions (Rodriguez, 2009), to be a pioneer in what is done, where the individual possesses an innovative attitude, which allows him to go beyond what is imposed by overcoming different challenges and barriers to overcome his own limits. An entrepreneur is a person who detects an opportunity and creates an organisation to face it. Thus, entrepreneurship

* *Corresponding author: amudarra@ujaen.es*

is a process purely based on the attitude of each person, who at the moment of detecting an opportunity seeks the necessary resources to take advantage of it (Freire, 2005).

By dynamic capabilities we mean the different skills, processes, procedures, organisational structures, decision rules and disciplines that enable the detection and capture of opportunities that arise in a company. Dynamic capabilities enable companies to create, implement and protect intangible assets that, in the long run, will enable superior business performance.

The main motivation for choosing this topic, women's entrepreneurship in rural tourism and its dynamic capabilities, is due to the fact that the importance of women in this sector as a driving force enables the permanence of the population in rural areas, a fact which is increasingly important. This can justify that the role of women is a very important factor in this field and can provide an answer to the successes or failures within the management of a company and what they may be due to and, in this way, be able to reach a conclusion about whether the role of women in the management of a tourism company is relevant to its success.

Another important factor for the choice of this topic is the important role that women are achieving in the world of work over time, this can highlight that inequality, a much talked about topic in recent years, is gradually declining, this is because women have improved their training, their rate of participation in the labour market, their salary level, among others. The fact that there are more and more women in the labour market is very important for the country's economy, as it has been empirically proven that the incorporation of women in the labour market in different countries has managed to increase their economy.

One of the characteristics that are leading to women attaining increasingly important positions is their dynamic capabilities. Women play a key role in the search for new economic opportunities in rural areas and are more open to change than men. Women have stimulated innovation in rural areas and have led to the revitalisation of their communities (Martínez-Gallo, 2021). The activity carried out by women allows them to gain, in some cases, economic independence, greater contact with the outside world, and gives them self-confidence, although it continues to be a stereotyped job.

These arguments lead us to set out the main objective of the research that we are going to try to resolve in the course of this study, which is to determine whether "Women, having different skills and abilities to men, manage companies in the tourism sector in a different way". The aim is to answer hypothesis 1.

H1: There is bibliographical evidence that determines the existence of different capacities or resources of women than men in the management of tourism enterprises in rural areas.

Specifically, with regard to women's entrepreneurship in the rural tourism sector, the number of women-led businesses has grown exponentially in recent years, both in developing countries and in advanced economies (Martínez-Gayo, 2021). The Global Entrepreneurship Monitor's (GEM) special report on female entrepreneurship reveals that in the last two years women's entrepreneurship worldwide has increased by 10%, while the gender gap has narrowed by 5%. In order to get a proper perspective on entrepreneurship in the rural tourism sector, a systematic review of the available literature and work in this field has been carried out. Through this review, it became clear that women entrepreneurs share many of the same traits in different countries, as well as the need to improve their quality of life. These characteristics served as an impetus for entrepreneurship in the sector. They all face obstacles such as the seasonality of tourism and traditional gender roles.

2. METHODOLOGY

In order to address the research objective of this article, a systematic peer review of the literature on women's entrepreneurship in tourism and rural tourism was conducted to include an analysis and synthesis of qualitative research in the field. Methodologically, the systematic review was conducted by summarising and analysing the evidence and quality of information in a structured, explicit and systematic format (Letelier et al., 2005; Thomas & Harden, 2008). This summary was prepared and written according to the methodological suggestions for improving transparency in the presentation of qualitative research synthesis: ENTREQ (Tong et al., 2012), and Preferred Reporting Items for Systematic Reviews and Meta-Analyses: PRISMA Statement (Moher et al., 2009).

2.1. Research strategies

The search consisted of a systematic review of articles on topics related to the Social and Legal areas published in Web of Science and Scopus. The search was carried out between October and November 2021 using search strings obtained with components created according to the main terms used in the published articles. These were: (1) Tourism, (2) Rural Tourism, (3) Entrepreneurship, (4) Gender, (5) Women, (6) Dynamic Capacities. The specific labels of each database were used, as well as the Boolean operators AND/OR. All these concepts were selected according to the objectives of the study. Finally, the documents were specified in relation to the date of publication or method of access. Table 1 summarises the bibliographic search strategies used in each database.

Table 1. Research strategies

Database	**Research strategies**
Web of Science (WOS)	Search 1 WOS: (Topic:((“tourism” AND “female OR gender OR Woman” AND “rural tourism” AND “entrepreneur OR entrepreneurship” AND “dynamics capabilities”))
Scopus	Search 1 Scopus: [title-abs-key: (“tourism”) AND (“female OR gender OR Woman”) AND (“rural tourism”) AND (“entrepreneur OR entrepreneurship”) AND (“dynamics capabilities”)]

2.2. Studies selection

Data from the studies included in the review were independently extracted by the principal investigator. In accordance with Chapter 2 - Systematic Reviews of Qualitative Evidence in the JBI Handbook (Lockwood et al., 2017) for evidence synthesis, specifically the data extraction section, the following fields were located in the included studies: Author and year, Methods of data collection and analysis, Country, Setting/Culture/Context, Participant characteristics, and Sample size indicated in the results. As part of a preliminary step, data were extracted and managed in electronic files and adapted before all studies were assessed together. Finally, a second author with methodological expertise validated the process and, with his participation, discrepancies were resolved by consensus, leaving finally articles with primary data focusing on the impact of entrepreneurship on women's tourism or rural tourism or qualitative studies based on the opinion of entrepreneurs in the sector on decision-making capacity and noticeable differences (Table 2).

Table 2. Selected articles

Author	Place	Poblation	Method
Basurto-Barcia & Ricaurte-Quijano (2017)	Guayaquil	Men & women	Both
Bogodistov et al., (2017)	Spain		Quantitative
Butkouskaya et al., (2020)	Galicia		Quantitative
Cabrera & Mauricio (2017)		Women	Both
Chambers & Rakić, (2018)	Zanzíbar		Quantitative
Costa et al., (2017)	Global	General poblation	Both
Cotelo et al., (2016)	Organisations		Both
Duffy et al., (2015)	Dominican Republic	Women	Qualitative
Elshaer et al., (2021)	Saudi Arabia	Women	Quantitative
Ertac & Tanova (2020)	Cusco & Puno		Quantitative
Figueroa-Domecq et al., (2020)	North East England	Women	Quantitative
Figueroa-Domecqa et al., (2020)	Global		Both
Freund & Hernandez-Maskivker, (2021)	Catalonia	Women entrepreneurs	Qualitative
Gerritsen, (2014)	Mexico	Women	Qualitative
Gil et al., (2019)	Cyprus		Quantitative
Hallak et al., (2015)	Australia	Men & women	Quantitative
Jimenez-Esquinas (2018)		Women	Both
Joo et al., (2020)	Fredericksburg, Texas, USA		Quantitative
Koc, (2019)			
Lapan et al., (2016)	Guatemala	Men & women	Qualitative
Lenao & Basupi, (2016)	Botswana		
Maliva et al., (2018)	Costa Rica		Qualitative
Mooney (2020)			Qualitative
Moswete & Lace, (2015)	Botswana	Men & women	Qualitative
Nunkoo et al., (2020)			Qualitative
Pettersson & Cassel, (2014)	Sweden	Women entrepreneurs	Qualitative
Radovi´c-Markovi & Živanovi (2019)	Costa Rica		Qualitative
Rey-Martí et al., (2015)	Galicia		
Ribeiro et al., (2021)	Spain	Women	Quantitative
Sampaio (2017)	Cuba		Both
Segovia-Pérez et al., (2019)			Qualitative
Tajeddini et al., (2017)	Bali		Qualitative
Tajeddini et al., (2017)	Bali	Women	Qualitative
Tran (2013)	Vietnam	Women	Qualitative
Xu et al., (2018)	China	Women	Qualitative
Zapalska & Brozik (2017)	New Zealand	Women	Qualitative

3. RESULTS

Information on the search and study selection process is shown in the PRISMA flow chart (Figure 2). The bibliographic search of the database yielded a total of 54,990 records.

References were eliminated through the cooperative work of academic peers. Following the procedure proposed in the flowchart, in the third stage, after independent peer review of titles and abstracts, a total of 54,943 records, including duplicate articles, were removed. Some of these studies in the database were found to be in a language other than English; however, when the titles and abstracts were examined, they were found to be discarded along with the rest because they addressed topics outside the scope of the study. 36 articles were selected for a full-text review, which met the selection criteria proposed for this research. Figure 2 shows the total number of articles removed and the reasons for their exclusion.

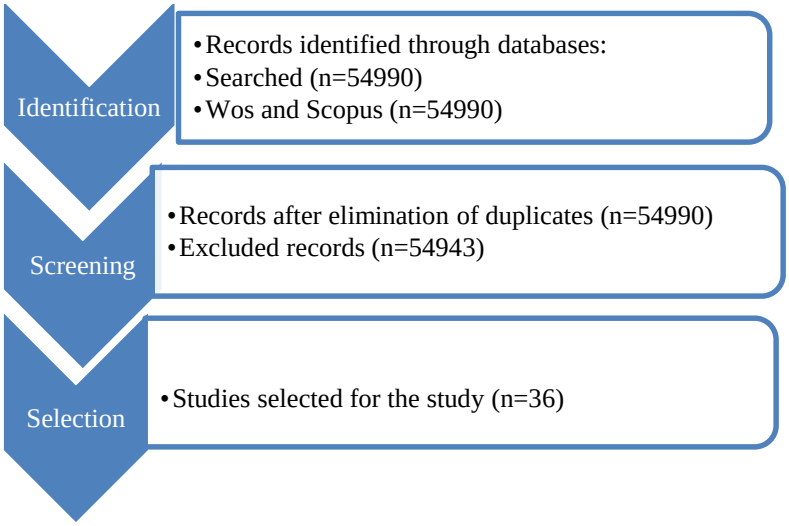


Figure 1. Selection process of items

Following the different proposals of the flow chart, a total of 36 studies met all the eligibility requirements and were included in the review. The total number of studies addressed issues related to gender tourism trends and rural tourism, more specifically focusing on the items women, entrepreneurship and dynamic skills as an influencing element. The studies cover a period of 22 years (2000-2022). The sum of the samples of the different studies corresponds to a total of 1084 participants, distributed in thirty-two countries and 5454 articles, which served as a reference for the review of some of the articles selected for the study. Within the articles, the different interviews and surveys have been carried out with a wide diversity of population, sometimes being different in the articles studied, so that the samples are composed of different population groups: (A) Women entrepreneurs, (B) Men entrepreneurs, (C) Students and (D) Microenterprises.

More specifically, fifteen of the thirty-six studies included deal with women's participation in the sector under study, these studied articles are based on how women have participated in the different areas of the tourism sector and what their experience has been like. While another eleven studies analysed the differences and difficulties of women in the sector, as well as the barriers they have had to overcome, both political-financial and cultural, and how they managed to overcome them. Finally, ten of the studies analyse how the sector has developed thanks to the involvement, empowerment and dynamic capacities of women. The articles analysed in this point develop the idea of women's empowerment as a skill that helps women entrepreneurs to face adversity and promote that this feeling is perceived by the population and thus helps the development of the sector and the development of women entrepreneurs who consolidate entrepreneurial companies in the sector.

With regard to the methods of data collection and analysis, the most commonly used instruments are the interview and the survey, and with regard to the method of analysis, the

most common within the studies carried out was the thematic analysis. The cultural and geographical contexts and the places where the studies were carried out varied considerably.

On the other hand, the search keywords of the analysed articles can be found in Figure 2. In the figure it can be seen that the predominant keywords in our selected bibliography for the study are the following together with their frequencies: gender (6.79%), tourism (5.43%), women (2.71%), entrepreneurship (1.81%), women's empowerment (1.81%), ecotourism (1.81%) and gender equality (1.36%).

Figure 2. Keywords

With regard to the study, it has been observed that the majority of the cases analysed have taken place in developing or underdeveloped countries, with the smallest number of cases located in fully developed countries or countries with a consolidated economic structure.

In terms of quality, this has been considered in terms of the existence of set objectives, keywords related to the objectives, number of citations (at least 60), structure consisting of an abstract, introduction, theoretical framework, methodology, results and conclusions, achievement of the objectives and clarity. Taking all these items into account, it can be affirmed that most of the articles have a good quality in terms of keywords, objectives and testing, since the keywords are related to the objectives set out in the literature studied and, furthermore, everything described in the summary is included in these articles. On the other hand, it can be determined that, in most of the articles analysed, the quality is lower than in the sections on number of citations, structure and quality. With regard to the number of citations, it can be said that the lack of a high number of references leads, in most cases, to confusing and biased conclusions, and the lack of structure in most cases led to even greater confusion, thus leading to a lack of clarity in the article itself.

4. CONCLUSIONS

There are several contributions to be found in this work. Firstly, it is worth highlighting its theoretical contribution, offering evidence to the scarce existing literature that analyses the entrepreneurship carried out by women in the rural tourism sector and its dynamic competences. On the other hand, in order to respond to the stated objective, a systematic analysis of the

existing literature has been carried out, obtaining a total of 47 articles that deal with issues related to entrepreneurship, women, rural tourism and dynamic capabilities, and this work identifies the need to expand the literature and the study on the influence of women's dynamic capabilities and soft skills in rural tourism enterprises.

On the other hand, it should be noted that the importance of this study lies in the exposure of the difficulties encountered by women in entrepreneurship in the sector, the need for further analysis of the reasons why the barriers previously encountered due to gender still exist today, albeit reduced, and the importance of overcoming these disadvantages in order for the sector to become one with greater influence and greater profitability.

In conclusion, it can be affirmed that the gender issue, which is highly topical due to the influence it has as a driving force to fix the population in rural areas, should be expanded to determine whether rural tourism can be one of the driving forces of the business sector, as well as to determine whether the dynamic capacities of women influence the business management of this type of business.

One of the main problems encountered was that, in some of the literature, the elaboration of the surveys and their execution did not correspond to the objectives of the survey, which shows the low quality of the articles. This is due to the fact that, if the data extraction proposed is about women's capabilities, the target population, in some cases, was also male entrepreneurs or microenterprises or even students in which the gender was not specified, in most cases, of the person in charge of the enterprise, providing confusing data and possibly leading to erroneous conclusions.

REFERENCES

Basurto-Barcia, J., & Ricaurte-Quijano, C. (2017). Women in tourism: gender (in) equalities in university teaching and research. Anatolia, 28(4), 567-581.

Bogodistov, Y., Presse, A., Krupskyi, O. P., & Sardak, S. (2017). Gendering dynamic capabilities in micro firms. Revista de Administração de Empresas, 57, 273-282.

Butkouskaya, V., Romagosa, F., & Noguera, M. (2020). Obstacles to sustainable entrepreneurship amongst tourism students: A gender comparison. Sustainability, 12(5), 1812.

Cabrera, E. M., & Mauricio, D. (2017). Factors affecting the success of women's entrepreneurship: a review of literature. International Journal of Gender and Entrepreneurship, 9(1), 31-65.

Chambers, D., & Rakic, T. (2018). Critical considerations on gender and tourism: An introduction. Tourism, Culture and Communication, 18(1), 1-8.

Costa, C., Bakas, F. E., Breda, Z., Durão, M., Carvalho, I., & Caçador, S. (2017). Gender, flexibility and the 'ideal tourism worker'. Annals of Tourism Research, 64, 64-75.

Cotelo Armenteros, S., Herrera Pérez, M., & Alarcón Armente, A. (2016). Gender and Public Politics. A Proposal for Tourism in the Jardines Del Rey-Cuba. Journal Tourism and Society, (18), 79-97. (in Spanish)

Duffy, L. N., Kline, C. S., Mowatt, R. A., & Chancellor, H. C. (2015). Women in tourism: Shifting gender ideology in the DR. Annals of Tourism Research, 52, 72-86.

Elshaer, I., Moustafa, M., Sobaih, A. E., Aliedan, M., & Azazz, A. M. (2021). The impact of women's empowerment on sustainable tourism development: Mediating role of tourism involvement. Tourism Management Perspectives, 38, 100815.

Ertac, M., & Tanova, C. (2020). Flourishing women through sustainable tourism entrepreneurship. Sustainability, 12(14), 5643.

Figueroa-Domecq, C., de Jong, A., & Williams, A. M. (2020). Gender, tourism & entrepreneurship: A critical review. Annals of tourism research, 84, 102980.

Figueroa-Domecq, C., Palomo, J., Flecha-Barrio, M., & Segovia-Perez, M. (2020). Technology double gender gap in tourism business leadership. Information Technology & Tourism, 22(1), 75-106.

Freire, A. (2005). Pasión por emprender: de la idea a la cruda realidad. Editorial Norma.

Freund, D., & Hernandez-Maskivker, G. (2021). Women managers in tourism: Associations for building a sustainable world. Tourism Management Perspectives, 38, 100822.

Gerritsen, P. (2014). Working with indigenous women on multifunctionality and sustainable rural tourism in western Mexico. Journal of Rural and Community Development, 9(3), 243-257.

Gil Arroyo, C., Barbieri, C., Sotomayor, S., & Knollenberg, W. (2019). Cultivating women's empowerment through agritourism: Evidence from Andean communities. Sustainability, 11(11), 3058.

Hallak, R., Assaker, G., & Lee, C. (2015). Tourism entrepreneurship performance: The effects of place identity, self-efficacy, and gender. Journal of Travel Research, 54(1), 36-51.

Jiménez-Esquinas, G. (2017). "This is not only about culture": on tourism, gender stereotypes and other affective fluxes. Journal of Sustainable Tourism, 25(3), 311-326.

Joo, D., Woosnam, K. M., Strzelecka, M., & Boley, B. B. (2020). Knowledge, empowerment, and action: Testing the empowerment theory in a tourism context. Journal of Sustainable Tourism, 28(1), 69-85.

Koc, E. (2020). Do women make better in tourism and hospitality? A conceptual review from a customer satisfaction and service quality perspective. Journal of Quality Assurance in Hospitality & Tourism, 21(4), 402-429.

LaPan, C., Morais, D. B., Wallace, T., & Barbieri, C. (2016). Women's self-determination in cooperative tourism microenterprises. Tourism Review International, 20(1), 41-55.

Lenao, M., & Basupi, B. (2016). Ecotourism development and female empowerment in Botswana: A review. Tourism Management Perspectives, 18, 51-58.

Letelier, L.M., Manríquez, J.J., & Rada, G. (2005). EVIDENCE-BASED MEDICINE Systematic reviews and meta-analyses: are they the best evidence? Rev. Méd. Chile, 133, 246–249. (in Spanish)

Lockwood, C., Porrit, K., Munn, Z., Rittenmeyer, L., Salmond, S., Bjerrum, M., Loveday, H., Carrier, J., & Stannard, D. (2017). Systematic reviews of qualitative evidence. Joanna Briggs Institute reviewer's manual. Adelaide: The Joanna Briggs Institute.

Maliva, N., Bulkens, M., Peters, K., & Van Der Duim, R. (2018). Female tourism entrepreneurs in Zanzibar: An enactment perspective. Tourism Culture & Communication, 18(1), 9-20.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., & Grp, P. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement (Reprinted from Annals of Internal Medicine), 89, 873–880.

Mooney, S. K. (2020). Gender research in hospitality and tourism management: time to change the guard. International Journal of Contemporary Hospitality Management 32 (5), 1861-1879.

Moswete, N., & Lacey, G. (2015). Women cannot lead: Empowering women through cultural tourism in Botswana. Journal of sustainable tourism, 23(4), 600-617.

Nunkoo, R., Thelwall, M., Ladsawut, J., & Goolaup, S. (2020). Three decades of tourism scholarship: Gender, collaboration and research methods. Tourism management, 78, 104056.

Pettersson, K., & Cassel, S. H. (2014). Women tourism entrepreneurs: doing gender on farms in Sweden. Gender in Management: An International Journal, 29 (8), 487-504.

Radović-Marković, M., & Živanović, B. (2019). Fostering green entrepreneurship and women's empowerment through education and banks' investments in tourism: Evidence from Serbia. Sustainability, 11(23), 6826.

Rey-Marti, A., Ribeiro-Soriano, D., & Palacios-Marques, D. (2016). Entrepreneurial attributes of human capital and contingency factors in the culinary tourism. International Entrepreneurship and Management Journal, 12(1), 67-85.

Ribeiro, M. A., Adam, I., Kimbu, A. N., Afenyo-Agbe, E., Adeola, O., Figueroa-Domecq, C., & de Jong, A. (2021). Women entrepreneurship orientation, networks and firm performance in the tourism industry in resource-scarce contexts. Tourism Management, 86, 1-15.

Rodríguez, A. (2009). New perspectives on understanding entrepreneurship. Pensamiento & gestión, 26, 94-119. (in Sapnish)

Sampaio, S. (2017). Tourism, gender and consumer culture in late-and post-authoritarian Portugal. Tourist Studies, 17(2), 200-217.

Sánchez-Rodríguez, C., & Martínez-Lorente, A. R. (2011). Effect of IT and quality management on performance. Industrial Management & Data Systems, 111(6), 830-848.

Segovia-Pérez, M., Santero, R., Figueroa-Domecq, C., & Castro, B. (2019). Characterisation of the wage gap in Spanish rural tourism: a comparison with the urban tourism work environment. Journal of Studies on Depopulation and Rural Development, (26), 7-34. (in Spanish)

Stevenson, H. H., Jarillo, J. C., & Krueger, M. F. (2002). A paradigm of entrepreneurship–entrepreneurial management. Entrepreneurship: Critical Perspectives on Business and Management, 3, 247.

Tajeddini, K., Ratten, V., & Denisa, M. (2017). Female tourism entrepreneurs in Bali, Indonesia. Journal of Hospitality and Tourism Management, 31, 52-58.

Tajeddini, K., Walle, A. H., & Denisa, M. (2017). Enterprising women, tourism, and development: The case of Bali. International Journal of Hospitality & Tourism Administration, 18(2), 195-218.

Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. BMC Medical Research Methodology, 8 (1), 1-10.

Tong, A., Flemming, K., McInnes, E., Oliver, S., & Craig, J. (2012). Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. BMC Medical Research Methodology, 12, 1–8.

Tran, L., & Walter, P. (2014). Ecotourism, gender and development in northern Vietnam. Annals of Tourism Research, 44, 116-130.

Xu, H., Wang, C., Wu, J., Liang, Y., Jiao, Y., & Nazneen, S. (2018). Human poverty alleviation through rural women's tourism entrepreneurship. Journal of China Tourism Research, 14(4), 445-460.

Zapalska, A., & Brozik, D. (2017). Māori female entrepreneurship in tourism industry. Tourism: An International Interdisciplinary Journal, 65(2), 156-172.

Volume XIX, Issue (1) (2023) 510-513

International May Conference on Strategic Management

VALIDATION OF GRAVIMETRIC METHOD FOR THE DETERMINATION OF AMIDE NITROGEN IN MINERAL FERTILIZERS

Marina Uđilanović[1*], Andrija Ćirić[1], Vesna Krstić[2,3]

[1]Faculty of Science, Department of chemistry, University of Kragujevac, Republic of Serbia; [2]Mining and metallurgy institute Bor, Republic of Serbia; [3]Technical Faculty Bor, University of Belgrade, Republic of Serbia

Abstract: The method for determining the content of amide nitrogen (NH_2-N) by gravimetric precipitation method is optimized, for quick analysis of mineral simple or complex fertilizer samples, whose performance is in accordance with the criteria from AOAC (Association of Official Analytical Chemists, 2016) and Eurachem (2019). The aim of this research is to check the performance of the gravimetric method for the specific form of nitrogen (amide) in fertilizers. It was determined that the combined measurement uncertainty of all contributions is very small (1.55%) and expanded measurement uncertainty of this gravimetric method is 3.10%.

Keywords: Method validation, different forms of nitrogen, mineral fertilizer, agro-chemistry

1. INTRODUCTION

Globally, nitrogen fertilizer application has increased rapidly and is expected to increase. Nitrogen fertilizers are those fertilizers that contain N as the main component in their final product. In nitrogen fertilizer, N is present as ammonia nitrogen such as ammonium chloride, ammonium sulphate; nitrate nitrogen such as calcium ammonium nitrate in which both ammonia and nitrate nitrogen are present; and urea (amide nitrogen). The most important and most commonly used nitrogen fertilizers are urea and ammonium sulphate (Regulation (EC) No 2003, 2003).

Many producers guarantee that the declared nitrogen content is correct during the production of mineral fertilizers, but the law still requires quality control of imported fertilizers, as well as checking the declared values to see if they are in line with the permitted deviations (Regulation (EC) No 2003, 2003). From this arises the need for validation and application of analytical methods for the determination of different forms of nitrogen in mineral fertilizers.

The content of amide nitrogen in mineral fertilizers can be determined using urease, which transforms amide nitrogen into ammonia nitrogen, which is then determined by titration using a standard solution of hydrochloric acid or by gravimetric using the method with xanthhydrol, where amide nitrogen is precipitated together with biuret, which can be determined as such without big mistakes. Criteria for method validation are limit of detection (LOD) and limit of quantification (LOQ), precision in terms of repeatability (RSDr) and

[*] *Corresponding author: marina.udjilanovic@miphem.rs*

reproducibility (RSDR), recovery (R), measurement uncertainty (U) and combined uncertainty (Uc) (AOAC, 2016).

2. EXPERIMENTAL PART

Blank samples were used to determine the LOD and LOQ. Solid Bopon fertilizer, 4x30 sticks, composition NPK 8:10:14, has 6% NH_2-N and Polyfeed 21:11:21+2 MgO has 13% NH_2-N, were used to determine RSDr and RSDR. The tested samples were prepared by grinding and sieving through an ISO sieve of 0.5 mm. Organic matter was removed by adding 30% hydrogen peroxide. Dissolved samples are transferred with a precision pipette into a 250ml beaker. Add 40 ml of acetic acid. Stir with a glass rod for 1 min, leave the precipitate to settle for 5 min. Filter on a flat layer into a 100 ml beaker, rinse with a few millilitres of acetic acid, then add 10 ml of xanthhydrol to the filtrate drop by drop, with continuous stirring with a glass rod.

Allow to settle until a precipitate appears. At that point, mix again for 1 or 2 min. Let it stand for 1.5 h. Filter through a glass filter crucible, which has been previously dried and weighed, gently press it; wash three times with 5 ml of ethanol (96%) without attempting to eliminate all acetic acid. Place in a drying oven and keep at a temperature of 130 °C for 1 h (do not exceed 145 °C). Allow to cool in a desiccator and weigh (SRPS EN 15604, 2009).

3. RESULTS

The LOD and LOQ were determined in 10 tests, and the standard deviation (SD) of the measurements was calculated. The LOD is obtained by multiplying the SD by 3.3 and the LOQ by 10 (Eurachem, 2019). The results are given in Table 1.

The precision of a method is a statement of the closeness of agreement between mutually independent test results (minimum 20 test) (SRPS EN 15478, 2009). Precision is expressed by standard deviation and consists of standard deviation of repeatability (RSDr) - standard deviation in series (the type of precision that corresponds to measurements made under repeatability conditions, i.e. same method, same material, same operator, same laboratory, same equipment, short period of time) and standard deviations of reproducibility (RSDR) (type of precision corresponding to measurements made under reproducibility conditions, ie same sample, same method, different operator, different laboratory, different equipment, long period of time). Precision in terms of repeatability and reproducibility is also expressed through the relative standard deviation (RSD, %) (Rakićević et al., Association of Chemical Engineers of Serbia, 2021; Internationa standard ISO/IEC 17025, 2017). RSD is calculated according to equation (1), Table 1:

$$\text{RSD} = \frac{SD}{Xsr} \text{ x } 100\% \quad (1)$$

The accuracy of the method is the closeness of the obtained value to the exact value. There are many methods for determining accuracy, but the Recovery test was used in the experiment. The content of amide nitrogen (NH_2-N) in the reference material Complex nitrogen fertilizer was analysed and calculated according to equation (2), Table 1:

$$\text{R} = \frac{X \text{ experimental value}}{X \text{ exact value}} \text{ x } 100\% \quad (2)$$

Express the result as the mass fraction in present of amide nitrogen plus biuret contained in the fertilizer by equation (3):

$$\% \ NH_2\text{-}N = \frac{6.67 \ x \ m1}{m2} \quad (3)$$

Where m_1 is the mass of the precipitate, in grams; m_2 is the mass of the sample, in [g], present in the aliquot part taken for the determination.

The calculation of the combined measurement uncertainty (Uc) includes the contribution from the impurity of chemicals, the error of measuring devices and laboratory equipment, RSDr, RSDR, Recovery ie bias by equation (4) (Rakićević et al., Association of Chemical Engineers of Serbia, 2021; Internationa standard ISO/IEC 17025, 2017):

$$Uc\ (\%) = \sqrt{U\ impurity^2 + \ bias^2 + \ RSDr^2 + \ RSDR^2} \quad (4)$$

The expanded measurement uncertainty is calculated using the factor k=2, which correspond to a confidence level of 95%, equation (5):

$$U\ (\%) = 2 \ x \ Uc \quad (5)$$

Validation requirements are in SRPS EN 15478:2009 Annex A, Table A.1 and AOAC. The summarized results are given in Table 1:

Table 1. Evaluation of obtained validation results

Validation parameter	Experimental results [%]	SRPS EN 15478:2009 Annex A, Table A.1 and AOAC [%]
LOD	0.02	/
LOQ	0.10	/
RSDr	0.29	≤ 0.30
RSDR	0.49	≤ 0.57
R	99.8	98-102
Uc	1.55	/
U	3.10	/

4. CONCLUSIONS

Based on the obtained validation characteristics of the method, it can be concluded that this procedure can be applied to determine the content of amide nitrogen (NH_2-N) using the gravimetric method with xanthidrol. The obtained validation parameters meet the criteria according to the AOAC specifications for accuracy, repeatability and reproducibility.

ACKNOWLEDGEMENT

The authors are grateful for the help and support of Miphem d.o.o. laboratory Belgrade and the Ministry of Science. The authors are grateful to the Ministry of Science, Technological Development and Innovation of the Republic of Serbia for contract No. 451-03-47/2023-01/200052.

REFERENCES

Regulation (EC) No 2003/2003 of the European Parliament and of the Council of 13 October 2003 relating to fertilisers, Official Journal L 304, 21/11/2003 P. 0001-0194, Annex I, Annex IV, method 2.6.1.

AOAC (2016). Association of Official Agricultural Chemists, Appendix F: Guidelines for Standard Method Performance Requirements.

SRPS EN 15604 (2009). Mineral fertilizers — Determination of different forms of nitrogen in the same sample containing nitrate, ammonia, amide and cyanamide nitrogen (in Serbian). Retrived from: https://iss.rs/sr_Cyrl/project/show/iss:proj:23554 (accessed on February 01, 2022).

Eurachem (2019). Measurement uncernity arising from sampling: A guide to methods and approaches, second edition. Retrived from: https://www.eurachem.org/images/stories/Guides/pdf/UfS_2019_EN_P2.pdf (accessed on December 26, 2022).

SRPS EN 15478 (2009). Mineral fertilizers - Determination of total nitrogen in urea (in Serbian) Retrived from: https://iss.rs/sr_Cyrl/project/show/iss:proj:23547 , accessed on March 08, 2022)

Rakićević, M., & Kostić, N. (2021). Association of Chemical Engineers of Serbia. Seminar SHI, Validation of methods in laboratory practice (in Serbian).

Rakićević, M., & Kostić, N. (2021). Association of Chemical Engineers of Serbia. Seminar SHI, Assessment of measurement uncertainty of routine analytical methods (in Serbian).

Internationa standard ISO/IEC 17025 (2017). General requirements for the competence of testing and calibration laboratories. Retrived from: https://iss.rs/sr_Cyrl/project/show/iss:proj:60059 (accessed on December 01, 2021).

Volume XIX, Issue (1) (2023) 514-517

International May Conference on Strategic Management

DESCARTES ON THE HEALTHY HUMAN BODY: CRITICAL ANALYSIS OF VARIOUS RESEARCH

Rūta Barkauskaitė, Rita Remeikienė*, Beatričė Rūškienė

Mykolas Romeris university, Lithuania

Abstract: The article reviews Rene Descarte's mind-body dualism theory, which is also relevant in modern life. This philosopher's theory became the basis for the branch of psychiatry to separate from other branches of medical science and become an independent branch of science that treats mental illnesses. The fact that when the mind is diseased, the body is also diseased, and although two different substances have different properties, it shows that mind and body are nevertheless more connected than we can imagine. The purpose of the article is to analyze Rene Descartes' theory of dualism to provide insights that would help specialists treating mental illnesses to understand that the body, although separated from the mind, reports signs and signals of mental illness, and on the contrary, if the body is in a stressful state, it can signal the reincarnation of stress on a higher emotional level, in the mind. Nevertheless, the theory has been developed to this day, it solves the current issues of treatment and methods of psychiatric diseases, which were proposed even in the time of Descartes (conversation, drugs).

Keywords: mind and body dualism, Descartes, depression, health.

1. INTRODUCTION

Mind-body dualism, in its original and most radical reasoning, reflects the philosophical view that mind and body (or matter) are fundamentally different kinds of substances or natures. This is where Descartes' main distinction between mind and body can be understood. (Correl, 2022). To this day, doctors are often guided by the biomedical concept of diseases, as there is a great lack of a unified approach to a person - the body is still often separated from the psyche. Psychosomatic pain is a very common phenomenon in modern life. It is called functional disorders (when a person feels symptoms, but there are no signs of a somatic disease), and their appearance is usually determined by psychological factors. It can be said that the disease of the body is caused by emotions, which are usually unconscious.

In scientific literature, Renes Descartes' theory of mind-body dualism is applied in medical research, explaining various psychological and physical pains (Maxwell, 2000; Mehta, 2011; Hamilton & Hamilton, 2015; Bennet, 2017; Matthews, 2017; Correl, 2022), so the question arises: how relevant is this theory in modern medicine?

The purpose of the article is to review Rene Descarte's mind-body dualism theory.

To set the goal, the following tasks are set: to analyze Descartes' body-mind dualism theory; present Descartes' interpretations of stress and depression caused by tension and present general conclusions.

* *Corresponding author: rita.remeikiene@mruni.eu*

Research methods: comparative and systematic analysis of scientific literature.

2. MIND AND BODY DUALISM: THEORY OF RENE DESCARTES

Mind-body dualism reflects the metaphysical state that mind and body are two different substances, each with a different essential nature. The theory of mind-body dualism was developed by Rene Descartes in the 17th century. Rene Descartes' theory states that humans are composed of two completely different substances (mind and body) that could not exist in unity. The mind is a thinking substance, but unextended, an immaterial, and the body is a non-thinking substance, but extended and material. The body is subject to mechanical laws, but the mind is not (Mehta, 2011). Descartes calls the body a machine. The movement of a body in space obeys the same laws as the movement of any other mechanism: the organs of the body act like springs in a mechanism. Moreover, body movement, hand or leg movements are in no way connected with the activity of consciousness (soul). Descartes in his unfinished work "Description of the Human Body" (La description du corps human, 1640) describes in detail what mechanical processes take place in the body: he perceived blood vessels as tubes that provided digested food to the heart and brain, which thus acquired a certain "life (vital) forces", which enabled the brain to think, imagine, dream. Also, the brain, according to Descartes, produced a certain "air" (again, saturated with a mysterious "vital force") that entered the muscles by nerves and gave them the ability to move. We can see that Descartes' conception of the body is very similar to the technical description of a modern hydraulic mechanism.

Mehta (2011) quotes Ryle (1949), who also explored the mind-body relationship „A person… lives through two collateral histories, one comprising of what happens in and to the body, the other consisting of what happens in and to his mind... The events in the first history are events in the physical world, those in the second are events in the mental world".

According to Descartes, our thinking mind, the res cogitans, is separated from the body as physical matter or substance, the res extensa (Hamilton & Hamilton, 2015). The transmission of sensory stimuli from the body to the mind is characterized by a physical capacity that is also transferred to animals, but the doubt to hesitate about physical stimuli originates from the mind. Since the doubting mind is a thinking thing, and thus differs from physical stimuli, it is through the doubting mind that truth and certainty as cogito ergo sum, or self-confidence, is attained. At this point, it would be important to quote Descartes' famous phrase: I think, therefore I am (Hamilton & Hamilton, 2015).

Even in the modern age, scholars delve into Cartesian theory of dualism. Mind-body dualism has historically presented a challenge in providing holistic care, treating the mind and body as completely different substances with different properties (Correl, 2022). This concept separated the provision of psychiatric care and treatment from other medical specialties, since it was recognized as a separate medical specialty in 1994.

Descartes' theory supported the Christian faith, which promoted the idea of an immortal soul, while the body was used to advance medical advances. If the body is an extended substance but the mind is not an extended substance, how can the body act on the mind and vice versa? How could they be connected? These questions arose in the letters of Princess Elizabeth of Bohemia during her correspondence with Descartes. The princess points to a central problem in understanding Descartes' mind-body dualism: in order for the soul to affect the body, shouldn't there be contact with the body? (Bennet, 2017).

In summary, we can conclude that the interaction between the body and the mind and its effect on each other began to be studied by Rene Descartes in the 17th century. Descartes' doctrine accepted the possibility of the Christian faith that the soul survives the

death of the body. The body is seen as purely material and it subjects to mechanical laws of causation, thus separating from the realm of spiritual or moral values. Throughout life, body and soul are "very close", but they are different substances, not separate worlds. A living person is a union of these dual substances (Duncan, 2000).

In summary, we can conclude that the interaction between the body and the mind and its effect on each other was begun to be studied by Rene Descartes in the 17th century. The body is mechanical, but the mind is a non-mechanical substance. These two substances are related, although the body without the soul would not survive, while it is believed that the soul without the body does. The theory of dualism of body and mind laid the foundations for the emergence of psychiatry as a separate medical field. It turns out that the soul can be sick as well, and soul diseases can be inferred through the body.

3. STRESS AND DEPRESSION AS THE BODY'S REACTION: DECARTES' EXPLANATIONS

Tension is necessary for every person, because during stress, adrenaline is released, which helps to focus, prepare for action, mobilizes the body, activates all senses, and the brain starts working much faster and more efficiently. As a result, a person can perform better during events that are important to him. But it's useful as long as it doesn't become a paralyzing fear. It is important to know that frequently repeated or constantly felt stress is dangerous; it leads a person to exhaustion, and in the long run damages the weakest areas like the heart, blood circulation and digestive systems, or damages the immunity, so the person is attacked by infectious diseases. A person feels constant tension and tiredness, wants nothing and has a headache. If not dealing with the constant tension, there appear symptoms of depression, anxiety disorders, panic attacks, or even the unwillingness to live. In order not to lead to depression for stress, the most important thing is to recognize the signals sent by the body. Stress can manifest itself in both physical and psychological signs.

In the correspondence between Princess Elizabeth of Bohemia and Descartes, Bennet (2017) mentions that the greatest cause of low-grade fever is sadness, and in order to eliminate the fever, it is necessary to find happiness in the small moments of life. Descartes recognized that stress had an effect on the mental state as well as the physical state. One could conclude that Descartes understood the importance of recognizing the impact of mental health on a person's physical health. Although scientifically, Descartes could not explain the interaction between mental and physical health, but the proposed psychosomatic rational therapy was supposed to help in solving mental health problems.

Here again, there is a dilemma as Descartes' rather holistic approach to illness challenged the emerging field of medicine, since physiological brain processes could not explain why someone felt a particular emotion. The theory of dualism explains that our mind does not work mechanically, it works accompanied by a certain reason. The disease was understood only from a mechanical point of view, so its mechanical definition did not fit into any disease classifications. A mental disorder would simply mean acting irrationally, which is not necessarily a disease (Correl, 2022).

Descartes refers to pain as one of the primary experiences that reveals the existence of the body. First, he observes that the sensations we get from the body cannot be taken as proof of the existence of the body, because pain sometimes deceives the mind. Pain as an existence-affirming phenomenon connects the soul to the body (Duncan, 2000).

Descartes physiologically explained how the body and soul work together. In the case of body sensations, he compares nerves to taut ropes that run from the affected part of the body to the brain. When pain is felt in the foot, it is due to a sensation that is transmitted

through the nerves, thereby exciting a certain movement in the brain. It should also be emphasized that Descartes' psychosomatic explanations of illness were not his main philosophical or scientific interest.

4. CONCLUSIONS

In summary, in its most general sense, Descartes' theory states that if I can uncontradictively perceive the existence of my soul without a body, then my soul can exist apart from my body, which in turn means that my soul is completely distinct from my body. In medical practice, psychosomatic pains resulting from diseases of the soul first manifest in the body. Hence, the mind gives signals to the body that the soul is sick. Pain is the initial signal that transmits information to the body about diseases of the mind. Although there are many ways to heal the soul, such as speech therapy, or medication, it is necessary to first find out the causes of the soul's illness, and only then choose the most effective way to heal the soul. When the soul is healed, the body will be healed.

REFERENCES

Bennet, J. (2017). Correspondence Between Descartes and Princess Elisabeth. Access from internet: earlymoderntexts.com/assets/pdfs/descartes1643_1.pdf.

Correll, J. (2022). Descartes' Dualism and Its Influence on Our Medical System. SUURJ: Seattle University Undergraduate Research Journal 6 (11), 47-55. Available at: https://scholarworks.seattleu.edu/suurj/vol6/iss1/11

Duncan, G. (2000). Mind-Body Dualism and the Biopsychosocial Model of Pain: What Did Descartes Really Say? Journal of Medicine and Philosophy 25 (4), 485-513.

Hamilton, S., & Hamilton, T. J. (2015). Pedagogical tool to explore Cartesian mind-body dualism in the classroom: philosophical arguments and neuroscience illusions. Frontiers in Psychology 6, 1155, 1-6.

Matthews, E. (2017). Mind-Brain Dualism and Its Place in Mental Health Care. Handbook of the Philosophy of Medicine, edited by Thomas Schramme and Steven Edwards, Dordrecht: Springer Science + Business Media, 345-357.

Maxwell, N. (2000). The Mind-Body Problem and Explanatory Dualism. Philosophy 75 (291), 49-71.

Mehta, N. (2011). Mind-body dualism: A Critique from a Health Perspective. In: Brain, Mind and Consciousness: An International, Interdisciplinary Perspective (A.R. Singh and S.A. Singh eds.), MSM, 9 (1), 202-209.

Ryle, G. (1949). The Concept of Mind. New York: Barnes and Noble.

Volume XIX, Issue (1) (2023) 518-526

International May Conference on Strategic Management

THE SHADOW ECONOMY AND ITS DANGEROUSNESS

Rita Remeikiene*, Ligita Gaspareniene

Mykolas Romeris University, Public Safety Academy, Lithuania

Abstract: Literature does not provide any universal definition of the shadow economy, there are various perceptions of this phenomenon, and the phenomenon itself is defined depending on the purpose of particular studies that highlight the features of the shadow economy as a complex phenomenon relevant to the research direction. In general, the shadow economy is defined as an aggregate of activities that are not recognized, registered, protected and/or not regulated by public authorities, so the purpose of the article is to analyse the shadow economy and its dangerous to the overall economy. The shadow economy comprises legal or illegal activities which are required by law to be fully reported, but which are deliberately hidden from authorities to evade overly strict market regulations, tax payment, and bureaucratic procedures related to business registration and execution. In the case of illegal activities, the shadow economy can be considered an object of a criminal act.
Different theories of the shadow economy propose that the results of different studies can reveal a fixed, variable or random relationship between the shadow economy and various macroeconomic indicators, so the impact of the shadow economy on the general economy can be treated either as negative or positive: although the shadow economy tends to reduce state budget revenue and distort natural market competition and information, at the same time it performs the functions of establishing closer relations among economic agents, generating or increasing their income, and distributing resources more efficiently than it is done in the formal economy.

Keywords: shadow economy, illegal activities, criminal act, tax payment.

1. INTRODUCTION

Since the time the term "shadow economy" was introduced, a considerable number of economists (Lewis, 1954; Rostow, 1960; Hart, 1973; Moser, 1978) have supported the idea that this sector of the economy is marginal, peripheral and related neither to the formal sector nor to the development of modern capitalism. Some believed that the shadow economy in developing countries would disappear once these countries reached a certain level of economic and industrial development. At present, the shadow economy is no longer considered a temporary phenomenon. Over the decades, researchers (Dell'Anno & Solomon, 2008; Schneider et al., 2010; Elgin & Schneider, 2016; Gasparėnienė et al., 2017; Medina & Schneider, 2018) have proved that the shadow economy is not only a natural part of the overall economy, but also a sector with a significant job and income generation potential. For this reason, effective political-economic frameworks and strategies to reduce the size of the

* *Corresponding author: rita.remeikiene@mruni.eu*

shadow economy can be developed by recognizing both the negative and positive effects of this sector on the overall economy.

Although in some definitions of the shadow economy (Elgin & Schneider, 2016; Gasparėnienė et al., 2017; Medina & Schneider, 2018, etc.) researchers make a distinction between legal and criminal activities, the authors of this article takes a more pragmatic approach provided by the OECD (2017): the shadow economy comprises "economic activities, whether legal or illegal, which are required by law to be fully reported to the tax administration but which are not reported and which therefore go untaxed unlike activities which are so reported." (OECD, 2017, p. 9). Although this interpretation of the shadow economy is imperfect like any other, it considers a wider range of different elements of the shadow economy that are actually visible to society and recognises that the shadow economy can exist within both legal and illegal activities if there is not full reporting, thus allowing for strategical thinking aimed at shrinking the size of the shadow economy.

Based on literature analysis, this article examines the concept of the shadow economy, reviews the theories of the shadow economy.

Research methods: analysis of legal acts, review of scientific literature analysis.

2. THE CONCEPT OF THE SHADOW ECONOMY

Both national and global economies are an aggregate of the formal and informal economy (Becker, 2004; Dell'Anno & Solomon, 2008; Williams & Round, 2008; Schneider et al., 2010; Yusuff, 2011; Remeikienė, et al., 2018, etc.). In the economic sense, the term "formal sector" has existed since the beginning of the industrial revolution. Back in 1973, Hart defined the formal economy as an economic area (zone) that is legally sanctioned, regulated through the mechanism of state intervention, and characterized by continuity of an activity. Meanwhile, the informal (shadow) economy is interpreted as a non-permanent work that is beyond the boundaries of legal sanction and state regulation (Hart, 1973).

Since the shadow economy is a complex, multisided, multifaceted and difficult-to-measure phenomenon, it is difficult to define it precisely. The concept of the shadow economy is quite vague because at different moments of history it covered different paradigms, disciplines, different interests; therefore, its meaning tended to change and evolve. For this reason, literature contains many different definitions of the informal, or shadow, also called hidden, underground, black, unregulated or unaccounted economy.

Different definitions of the shadow economy can be grouped with consideration of which aspect or feature of this multifaceted phenomenon is highlighted. Based on the grouping proposed by Brief Methodological Analyses (2012), the definitions of the shadow economy are of the following context:

1) fiscal;
2) market (economic);
3) legal;
4) statistical.

The fiscal context definitions associate the shadow economy with tax evasion and false accounting. The market context definitions delve into the aspects of reducing operational costs (money, time, and effort), increasing competitiveness, generating and increasing profits of economic agents operating in the informal sector. The legal context definitions emphasize that informal activities are carried out in violation of the provisions of the law. The statistical context definitions are related to aspects of non-declaration and unaccountability of informal activities. The literature analysis allows to complement the above-introduced grouping of the definitions of the shadow economy with one more group – the definitions of social context

which propose that informal activities are determined by historical traditions and personal relationships.

Even the same groups of the definitions of the shadow economy can emphasise different features of this phenomenon, depending on the purpose of particular research (see Table 1).

Table 1. The major features of the shadow economy emphasised in the definitions of different context (compiled by the authors)

Context	Features	Literature sources
Fiscal	Tax evasion	Dell'Anno & Solomon, 2008; Schneider et al., 2010; Medina & Schneider, 2018; Remeikienė et al., 2021
	Financial payment/settlement fraud	Petersen et. al., 2010
	Wort time reporting fraud	Schneider et al., 2010
	Payroll accounting fraud	Schneider et al., 2010
Market (economic)	Work beyond the forma labour market	Hart, 1973; Hope, 2014; Gasparėnienė & Remeikienė, 2015; Remeikienė et al., 2021
	Informal activities to avoid strict market regulations	Medina & Schneider, 2018; Remeikienė et al., 2021
	Distortions of competition	Horodnic & Williams, 2016
Legal	This is a legally sanctioned (not criminal) and criminal activity	OECD, 2017
	Non-compliance with legally established standards	Schneider, 2012
	Operators are not legally protected by the state	Hope, 2014
Statistical	Avoidance of providing statistical data	Schneider et al., 2010; Herwartz et al., 2016
	Exclusion from national income accounts (GDP distortions)	Mahmood, 2020
Social	The impact of traditions	Godfrey, 2011
	The impact of social relations	Godfrey, 2011; Remeikienė et al., 2021

As it can be seen in Table 1, the definitions of the fiscal context highlight such features of the shadow economy as tax (income, value added, social security contributions, health insurance contributions, etc.) evasion, fraud in financial payments and settlements, declaration of minimum wages instead of the actual wages paid (so-called "envelope wages"), and frauds related to work time reporting.

In the market context, the shadow economy is defined by taking into account work in the informal labour market, the conduct of informal activities to avoid strict market regulations and/or to reduce the costs of entering the market and operating in it, and defective activities in which informal economic agents unfairly compete with formal ones, thereby distorting the principles of fair market competition.

In the legal context, the shadow economy is defined as either legally sanctioned (i.e. not criminal) or unsanctioned (i.e. criminal) activity that is conducted without complying with legally established standards (e.g. occupational safety requirements, established administrative procedures, etc.), thereby weakening the legal economic-social basis of collective agreements and not allowing economic agents to be legally protected by the state (e.g. to file lawsuits due to another party's breach of contractual obligations, etc.).

In the statistical context, the shadow economy is defined as non-participation of informally operating economic agents in statistical data collection and accounting systems (i.e. these agents do not provide the data on their activities to statistical institutions, state tax inspectorates) and non-inclusion of the relevant data in national income accounts, which leads to distortions in GDP estimations.

Finally, *in the social context*, the shadow economy is defined as an informal activity stimulated by the established traditions and social ties in a particular community or family (e.g. the ties among relatives, neighbours). In this respect, the shadow economy can also refer to informal activities determined by a low level of public morality.

After analysing the concept of the shadow economy, it is relevant to move on to the analysis of theories of the shadow economy.

Both anthropological and economic studies (Schneider et al., 2010; Hart, 1973; Hope, 2014; Weng, 2015; Medina & Schneider, 2018; Remeikienė et al., 2021, etc.) show that since ancient times, people in all societies have tended to adapt their activities to the provisions of the existing economic system, not only to comply with these provisions, but also to evade them. Hence, if we treat informal economic activities as activities that are conducted not to be reached by the regulatory norms set in a regulated economic system, then we could say that the informal economy is of the same age as the formal (i.e. regulated) economy because after introducing regulatory economic systems, the latter tend to provide an incentive for societies to circumvent the regulations, especially if they seem too strict, unreasonable or unjust. Thus, although historically both the formal and the informal economy can be associated even with early societies (for example, the first known Sumerian civilization in the historical region of Mesopotamia), the concept of the shadow economy itself is relatively recent, as are the theories explaining this phenomenon.

3. THE THEORIES OF THE SHADOW ECONOMY

Authors Bangasser (2000) and Becker (2004) consider W. Arthur Lewis (1954) to be one of the pioneers of the shadow economy theories. In the mid-1950s, W. Arthur Lewis (1954) provided a theoretical model of economic development based on the assumption that many developing countries are characterized by an unlimited supply of labour (the assumption of an unlimited labour supply), and further development of these countries leads to their industrial sector absorbing the excess labour. Leaning on this assumption, Lewis (1954) argued that the sector of unreported economy, which includes small traders, small producers and casual workers, is sooner or later absorbed by the expanding formal economy and therefore disappears. Among the early theories of the shadow economy, Bangasser (2000) mentions Prebisch's theory of industrialism (announced in 1949, and published in 1950), Leibenstein's (1957) "big push" theory and Rostow's (1960) stages of economic growth. Bangasser (2000) also notices that all these early theories rely on the argument that the shadow economy tends to gradually disappear with an increase in material well-being, the main measure of which is the growing income per capita. This way of thinking was determined by the rapid industrialization after the Second World War, when there seemed to be no reason why well-intentioned measures of economic development should not work as intended, i.e. the authors relied on the assumptions of positive rather than normative economics.

The later trends of economic development, however, revealed that the aforementioned assumptions were not reliable: the unreported sector of the economy in developed countries did not disappear; actually, it was gradually growing, and the surplus labour force in the unreported sector was able and is still able to create separate sources of livelihood (Becker, 2004). This led to the further development of the concept of the shadow economy, as well as the theories explaining this phenomenon. Bangasser (2000) proposed a timeline reflecting the evolution of the concept of the shadow economy that can be complemented considering the insights of Chen (2012) and other authors.

In the mid-1950s, when the unemployment rate was increasing, and the optimism concerning economic growth in developed countries was decreasing, A. Lewis's (1954) assumptions were discredited, and researchers began to generate new theories to explain the new economic situation. In 1970, A. Lewis's theory was challenged by Hans Singer who attributed both unemployment rate and various types of labour shortages, observed even in developed, economically growing countries, to the imbalance which the author believed to be arising from the technological progress, i.e. H. Singer argued that the limited potential of creating jobs (the growing unemployment rate) is determined by the intensive use of capital-intensive technologies and a rapid population growth. Based on this, the author predicted duality in the labour market, i.e. high levels of casual work and intermittent employment accompanied by high levels of hidden and/or open unemployment. H. Singer's assumptions laid the foundations for the theory of duality. Later Moser (1978) introduced the structural theory which considered the informal economy a subordinate economic unit. Thus, the 1970-1980 period can be treated as an incubation period for evolution of the concept of the shadow economy, when both the concept itself and the theories explaining it were getting mature and extensive.

In the early 1980s a legalistic theory of the informal economy have been presented that considered the informal economy as a sector with small entrepreneurs in which the latter choose to operate to evade the costs (economic and time) and effort of registering activities; in addition, small entrepreneurs operating in the informal sector would need to acquire property rights to be able to turn their assets into legally recognised ones. The author also mentions strict formal regulation and bureaucratic processes as determinants of informal activities.

After 2000, on the initiative of the International Labour Organization that presented an overview of the statistical data reflecting the situation of men and women in the informal economy (International Labour Organization, 2002), the definitions of the shadow economy were further being expanded: they started including the additional characteristics of informal activities and economic agents operating in the informal sector (e.g. informal self-employment, informal work, etc.) to allow measuring this phenomenon. Thus, the shadow economy became a broad, heterogeneous area.

Maloney (2004) developed the theory of voluntarism which proposed that businesses operating in the informal sector unfairly compete with businesses operating in the formal sector with a view to evading formally established provisions, taxes and other production costs. The supporters of voluntarism argue that informal businesses should be transferred to the formal, regulated sector of the economy to strengthen the tax base and reduce unfair competition (Maloney, 2003).

Later, to prevent the development of the shadow economy as a negative economic phenomenon, researchers began to delve deeper into the motives pushing individuals into informal activities. Thus, the shadow economy was linked to exclusion of particular groups of individuals. This attitude served as a basis for the theory of marginality (von Braun & Gatzweiler, 2014; Clement, 2015) which proposed that individuals engage in informal activities when they find themselves in a marginal position, i.e. when their voice is no longer heard in political debates, when their social and economic bargaining power is lost. Individuals deprived from the social, economic, technological, infrastructural and public service progress become motivated to operate in the informal sector.

In the latest scientific works, the shadow economy is interpreted as an integral part of the overall economy since the value created in the informal sector is reflected in the officially calculated GDP (Schneider, 2011); it is also defined by considering the motives of both economic agents and consumers to participate in the informal sector (Gasparėnienė et al., 2017), the technologically-driven expansion of the areas of informal activities (digital shadow

economy) (Remeikienė et al., 2018), the relationship with the quality of public management (corruption) (Osmani, 2015) and many other factors.

Table 2. Strengths and weaknesses of the theories explaining the phenomenon of the shadow economy (compiled by the authors)

Major concept	Strengths	Weaknesses
Modernisation theory		
Informal work and production forms in developed countries must disappear because of the economic progress	Based on an optimistic view of economic development; under favourable conditions, economic agents tend to choose official rather than informal activities	Not applicable for developing countries and the cases of unfounded optimism
Dualistic theory		
Informal activities are determined by the intensive use of capital and population growth	Considers the level of casual work and intermittent employment and the level of hidden unemployment	The theory does not consider the impact of market regulation and taxes
Structural theory		
The shadow economy is a system of goods and services distribution used by capitalist companies; it is also a method of production and work organising	Considers the fact that informal activities are carried out for the purpose of reducing operating costs; considers the factor of cash payments	Emphasis is placed on work under subcontracting agreements; informal self-employment is not taken into account
Dependency theory		
Informal activities are complex, organised and dynamic income-generating activities conducted by informal enterprises	Considers an organised rather than a random character of informal activities	Informally operating economic agents are characterized as the poor in a marginal position
Legalistic theory		
The shadow economy is characterized by the activities of small entrepreneurs, when the latter seek to reduce their activity costs without registering activities	Reduction of the monetary, time and institutional costs is recognized as the major motive for conducting informal activities	Emphasis is placed on small business only
Voluntaristic theory		
Economic agents operating in the informal sector unfairly compete with businesses operating in the formal sector	Considers not only purely economic (cost reduction), but also legal aspects of the shadow economy (unfair competition)	The shadow economy is not considered a natural part of the overall economy; it must be transferred to the regulated sector
Marginal theory		
The shadow economy attracts economic agents that have lost their political, social and economic bargaining power	The socio-economic exclusion of an economic agent is recognized as the key motive for involvement in informal activities	The theory does not consider informal activities of profitable businesses
Neoliberal theory		
Informal activity is a natural response to over-regulation of the market	Reduction of the monetary, time and institutional costs is recognized as the major motive behind operating in the informal sector	The theory does not explain the existence of the shadow economy under the conditions of easing regulatory restrictions; it does not consider informal activities of profitable businesses
Post-structural theory		
Informal activities are aimed at establishing closer social ties	Considers the social and distributional functions of the shadow economy	The theory does not explain the motives of economic agents to reduce operating costs

Despite the abundance of the attitudes towards the shadow economy, literature analysis (Yusuff, 2011; Chen, 2012; Adom & Williams, 2014; Clement, 2015, etc.) proposes that modernisation, dualistic, structural, dependency, legalistic, voluntaristic, marginal, neoliberal and post-structural theories should be considered as the major economic theories that explain the phenomenon of the shadow economy. The strengths and weaknesses of these theories are reviewed in Table 2.

Table 2 shows that different theories explaining the shadow economy emphasize different grounds of this phenomenon, and therefore focus on different determinants. Since the results of the studies based on particular theories or combing some of them may reveal a fixed, variable or random relationship between the shadow economy and the population's income, employment rate, GDP and other economic indicators, the effects of the shadow economy on the general economy can be interpreted either as negative or positive. It is observed that transition of entrepreneurs from the formal to the informal sector not only reduces state budget revenue, but also distorts the natural market competition and information, and can, therefore, lead to adoption of inefficient political and economic decisions. On the other hand, although the size of the shadow economy may differ from country to country due to the principles of either socialist or market economy, stricter or less strict market regulation, the impact of the existing tax framework, etc., the shadow economy can at the same time establish closer relations among economic agents, generate or increase their income, and distribute resources more effectively than it is done in the formal economy. Thus, the relationship between the formal and informal economy depends on the nature of the interaction between these economic structures.

4. CONCLUSIONS

To summarise, literature does not provide any universal definition of the shadow economy; there are various perceptions of this phenomenon, and the phenomenon itself is defined depending on the purpose of particular studies that highlight the features of the shadow economy as a complex phenomenon relevant to the research direction. In general, the shadow economy is defined as an aggregate of activities that are not recognized, registered, protected and/or not regulated by public authorities. The shadow economy comprises legal or illegal activities which are required by law to be fully reported, but which are deliberately hidden from authorities to evade overly strict market regulations, tax payment, and bureaucratic procedures related to business registration and execution. In the case of illegal activities, the shadow economy can be considered an object of a criminal act.

Different theories of the shadow economy propose that the results of different studies can reveal a fixed, variable or random relationship between the shadow economy and various macroeconomic indicators, so the impact of the shadow economy on the general economy can be treated either as negative or positive: although the shadow economy tends to reduce state budget revenue and distort natural market competition and information, at the same time it performs the functions of establishing closer relations aong economic agents, generating or increasing their income, and distributing resources more efficiently than it is done in the formal economy.

REFERENCES

Adom, K., & Williams, C. C. (2014). Evaluating the explanations for the informal economy in the third world cities: some evidence from Koforidua in the eastern region of Ghana. International Entreprise Management Journal, 10, 427– 445.

Bangasser, P. E. (2000). The ILO and the informal sector: an institutional history. Retrieved from: http://www.ilo.int/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_142295.pdf

Becker, K. F. (2004). The informal economy: Fact finding study (Stockholm, Swedish International Development Cooperation Agency (SIDA)).

Brief Methodological Analyses. (2012). The shadow economy: how to measure and model it? Retrieved from: https://www.minfin.bg/document/9795:4

Chen, M. A. (2012). The informal economy: definitions, theories and policies. Retrieved from: https://www.wiego.org/sites/default/files/publications/files/Chen_WIEGO_WP1.pdf

Clement, C. (2015). The formal-informal economy dualism in a retrospective of economic thought since the 1940s. Violette Reihe: Schriftenreihe des Promotionsschwerpunkts "Globalisierung und Beschäftigung" 43/2015, University of Hohenheim, Carl von Ossietzky University Oldenburg, Evangelisches Studienwerk.

Dell'Anno, R., & Solomon, O. H. (2008). Shadow economy and unemployment rate in USA: is there a structural relationship? An empirical analysis. Applied Economics, 40(19), 2537–2555.

Elgin, C., & Schneider, F. (2016). *Shadow economies in OECD countries: DGE vs MIMIC approaches*. Retrieved from: http://www.bujournal.boun.edu.tr/docs/1473243011BJ30_3.pdf

Gasparėnienė, L., & Remeikienė, R. (2015). Digital shadow economy: a critical review of the literature. Mediterranean Journal of Social Sciences, 6 (6), 402–409.

Gasparėnienė, L., Remeikienė, R., & Schneider, F. G. (2017). Concept, motives and channels of digital shadow economy: consumers' attitude. Journal of Business Economics and Management 18(2), 273 - 287.

Godfrey, P. C. (2011). Toward a theory of the informal economy. The Academy of Management Annals, 5 (1), 231–277.

Hart, K. (1973). Informal income opportunities and urban employment in Ghana. Journal of Modern African Studies, 11(1), 61 - 89.

Herwartz, H., Sardà, J., & Theilen, B. (2016). Money demand and the shadow economy: empirical evidence from OECD countries. Empir Econ 50, 1627–1645.

Hope, K. R. (2014). Informal economic activity in Kenya: benefits and drawbacks, African Geographical Review, 33(1), 67 - 80.

Horodnic, I., & Williams, C.C. (2016). An evaluation of the shadow economy in Baltic states: a tax morale perspective. International Journal of Entrepreneurship and Small Business, 28 (2-3).

International Labour Organisation (2002). Women and men in the Informal Economy: a statistical picture, Geneva.

Lewis, W. A. (1954). Economic development with unlimited supplies of labour (Manchester School of Economic and Social Studies, 23 (2), 1-30. Retrieved from: https://la.utexas.edu/users/hcleaver/368/368lewistable.pdf

Mahmood, Z. (2020). Formalizing Pakistan's informal economy policies. Retrieved from https://www.researchgate.net/

Maloney, W. F. (2003). Informal self-employment: Poverty trap or decent alternative? In Pathways out of poverty (pp. 65–82). Springer.

Medina, L., & Schneider, F. (2018). Shadow economies around the world: What did we learn over the last 20 years? International Monetary Fund (Research Paper No. WP/18/17).

Moser, C. N. (1978). Informal sector or petty commodity production: dualism or independence in urban development. World Development, 6 (9-10),1041–1064.

OECD. (2017). Shining light on the shadow economy: opportunities and threats. Retrieved from: https://www.oecd.org/tax/crime/shining-light-on-the-shadow-economy-opportunities-and-threats.pdf

Osmani, R. (2015). The level of the shadow economy, tax evasion and corruption: The empirical evidence for SEE countries, SEEU Review, 11(2), 7–23.

Petersen, H. G., Thiessen, U., & Wohlleben, P. (2010). Shadow Economy, Tax Evasion, and Transfer Fraud - Definition, Measurement, and Data Problems, International Economic Journal, Taylor & Francis Journals, 24(4), 421-441.

Remeikienė, R., Gasparėnienė, L., Chadyšas V., & Cepel, M. (2018). Identification of the shadow economy determinants for the eurozone member states: application of the MIMIC model, Journal of Business Economics and Management, 19(6), 777–796.

Remeikienė, R., Gasparėnienė, L., Yorulmaz, O., Schieg, M., & Stasiukynas, A. (2021). Evaluation of the level of shadow economy in Lithuanian regions, Journal of Business Economics and Management, 22(5), 1360–1377.

Rostow, W. W. (1960). The five stages of growth: a summary. The Stages of Economic Growth: A Non-Communist Manifesto (Cambridge: Cambridge University Press, 1960), 4 - 16.

Schneider, F. (2011). The shadow economy and shadow economy labour force: what do we (not) know? Retrieved from: https://docs.iza.org/dp5769.pdf

Schneider, F. (2012). The Shadow Economy and Work in the Shadow: What Do We (Not) Know? Retrieved from: https://docs.iza.org/dp6423.pdf

Schneider, F., Buehn, A., & Montenegro, C. (2010). New estimates for the shadow economies all over the world. International Economic Journal 24(4), 443 - 461.

von Braun, J., & Gatzweiler, F. (2014). Marginality: addressing the nexus of poverty, exclusion and ecology. Retrieved from: https://www.prismaweb.org/nl/wp-content/uploads/2016/10/Marginality-Addressing-the-nexus-of-poverty-exclusion-and-ecology%E2%94%82von-Braun-and-Gatzweiler%E2%94%822014.pdf

Weng, X. (2015). The rural informal economy. Understanding drivers and livelihood impacts in agriculture, timber and mining. Retrieved from: http://pubs.iied.org/pdfs/16590IIED.pdf

Williams, C. C., & Round, J. (2008). Retheorizing the nature of informal employment: some lesson from Ukraine. International Journal of Economic Perspective, 3(1), 45–58.

Yusuff, O. S. (2011). A theoretical analysis of the concept of informal economy and informality in developing countries. European Journal of Social Sciences, 20 (4), 624–36.

Volume XIX, Issue (1) (2023) 527-539

International May Conference on Strategic Management

RESEARCH ON THE IMPACT OF BUSINESS PROCESS MANAGEMENT ON THE SUCCESS OF COMPANIES IN SERBIA

Milan D Ilić[1*], Snežana Urošević[2], Milovan Vuković[2]

[1] Serbian Armed Forces, Land Army, 69. Logistic battalion, Serbia; [2]University of Belgrade, Technical Faculty in Bor, Serbia;

Abstract: The subject of research in this paper is determining the maturity of companies in terms of business success in Serbia and their understanding of business processes. The objectives of the research have defined how employees in companies understand business processes and whether employees are divided into process teams where the owner of the process is clearly defined. The survey was conducted in 73 companies in Serbia, where the results were obtained through the survey method, after which an analysis of the state of understanding of business processes was carried out. The survey covers state and private enterprises, i.e. small, medium and large enterprises. The obtained results tell us that there is a culture of understanding and applying management processes, but that some employees in the organization in lower positions in the company still do not sufficiently understand or apply them.

Keywords: The owner of the process, business teams, Poll

1. INTRODUCTION

In today's global economy, many companies are looking for ways to increase business efficiency and at the same time reduce operating costs. By applying an adequate model for managing business processes, it is possible to reduce production costs, improve work of organization and increase profits. Process orientation helps companies to better define and accept the owner of the process, terms in the process as well as increased productivity of the output product.

The importance of process orientation is best reflected by the conclusion of the consulting company Gartner: "Business process management wins the triple crown: to save time, to save money and to add value" (Bosilj Vukšić, et al., 2008). It must be mentioned that with the introduction of process organization, a new so-called process management is created and a new role arises in the organization, and that is the owner of the process.

Business process management refers to a modern managerial discipline that puts processes at the center of consideration. Building business processes is a complex and responsible task of the management of any organization, regardless of its activity or size (Drljača, 2003). Within the spectrum of different levels of decision-making, business process design represents the first dimension of business process management and is traditionally considered a strategic issue.

Typical examples of strategic decisions relevant from the point of view of business process management are decisions on the restructuring of business processes, on the

[*] *Corresponding author: lanemts83@hotmail.com*

organization to be involved in the execution of business processes (with outsourcing as a strategic alternative), as well as decisions on financial, logistical, quality goals and other business process objectives (Reiers, 2003). Process-oriented organizations manage processes and continuously improve their core processes in relation to added value for consumers (Hrabula et al., 2017).

2. DEFINITION OF BUSINESS PROCESSES

A process is a series of actions, changes, or functions that produce a particular result. There is no single definition of a business process and depends on the context in which it is used. A business process is an activity or set of activities or operations that execute a specific objective of an organization. In business processes, after processing input data, we get a shared output or product. Each organization can have different business processes depending on the spectrum. From the aspect of organizational structure, a business process is a chain of activities that contributes to the realization of the business goal of the enterprise by combining technology, resources, production methods and people.

Understanding and defining the basic business characteristics according to Bosilj Vukšić et al. (2008) are as follows:

- Every process has a purpose,
- Each process has an owner,
- Every process has a beginning and an ending,
- The inputs come in, and the outputs come out,
- The process is composed of sequentially feasible activities,
- Based on the input and output of the process, the success of the process is easily determined,
- Improving the process is inevitable.

The processes represent the basis for the design and establishment of new organizational systems, consideration of the level of organization of existing organizational systems and its increase, solving problems of organizational systems in time and development of parts of organizational systems (Radovic et al., others 2012). The basic model of the process is in the following picture.

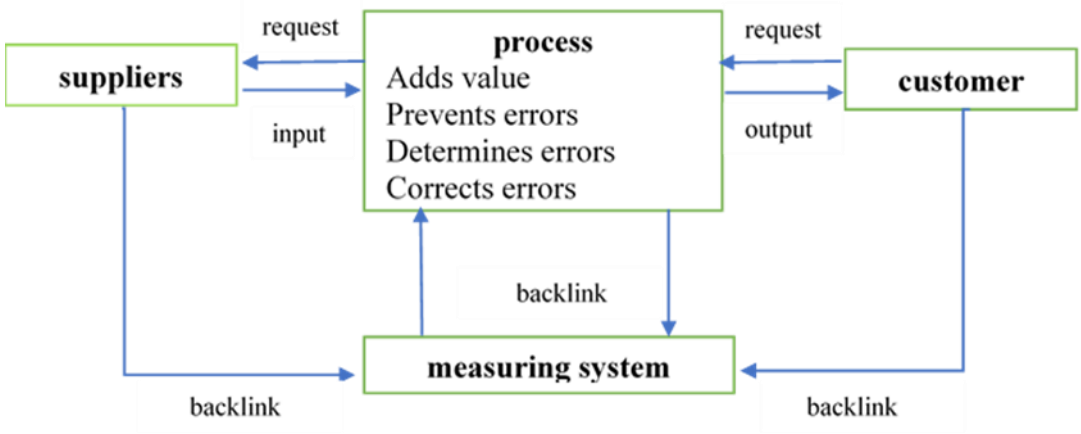


Figure 1. Basic process model (Hernaus, 2016)

According to Figure 1, it can be concluded that the basic role of the process is the creation of value, after which it is carried out to determine and prevent the occurrence of errors. For every process, there is a measurement system that measures its success. Process input is

represented by suppliers, while at output from the process are customers. Customer satisfaction is measured and based on the results, the process is influenced.

Just as there are different definitions of the process, there are different divisions. Author Melan (Melan, 1992) divides the processes into production and service, according to the subject of the work. Rentzhog (Rentzhog, 2000) emphasizes the division into base and supportive according to whether these are basic processes or processes that provide support. According to the frequency, the processes can be daily, intermittent and very rare (Radović et al., 2012). In relation to the state and significance of the process according to current goals, processes can be critical, crucial and priority (Radović et al., 2012).

It must be noted that business process management has found its primary role in manufacturing organizations, followed by fewer service-focused organizations focusing on their business processes.

A group of authors (Vergidis et al., 2008) examined the impact of process orientation on the business practices of companies. Research has shown that although in theory numerous studies deal with the use of sophisticated techniques and tools for business process management, in practice this is not the case. Companies use simpler tools to manage processes because they are still not sufficiently convinced of the positive societies of process orientation. The solution is to find a method for managing business processes that would be convenient to use and show clear results.

Authors from Japan and Singapore (Tang et al., 2013) investigated the impact of process orientation on the innovation performance of organizations. Based on the conducted research, a positive relationship between process orientation and innovation performance of companies was confirmed. Of course, to achieve positive results of innovation performance, it is not enough just to define the process, it also requires strong cross-functional cooperation

When it comes to the process maturity of companies authors from Slovenia and Croatia (Bosilj Vukšić et al., 2010; Vlahović et al., 2010) explored the refractive points in which companies move from one level of maturity to another. According to the results of the research, the transition from a lower to a high level of process orientation comes with the introduction of the role of process owner. Companies must strive to improve their employees in order to make it easier for them to understand the reasons for introducing process orientation and their role as an individual in the entire process.

3. THE CONCEPT OF BUSINESS PROCESS MANAGEMENT

The business of companies in Serbia, as well as in the world, is under enormous pressure from great competition, a rapidly changing business environment and increasingly demanding customers.

All these pressures have created an interest in analyzing how business can become more flexible and effective. Each organization is defined by a lot of business processes that describe the way the organization conducts its business. Some processes are crucial to an organization's operations and make it a comparative advantage. Some are not so crucial, but they are still essential for its functioning. Business processes are essentially the nervous system of any company and therefore it is important to manage them.

Business process management combines a managerial approach with appropriate technology to improve the performance of the enterprise. Business Process Management (BPM) is an integral part of a business based on shaping, measuring, analyzing, improving and managing processes. Business process management covers the entire process lifecycle: from defining – modeling – performing - analyzing and optimizing processes (Figure 2).

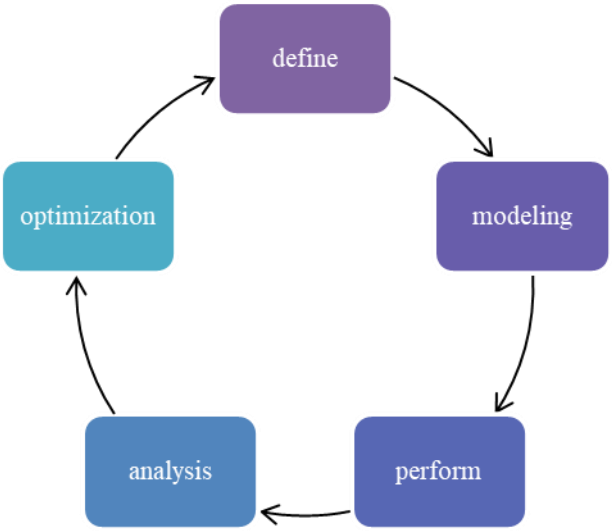


Figure 2. Business process management lifecycle (Becker et al., 2003)

The first step in managing business processes is to define business processes. Business process owners have the most important role at this stage because they have business requirements and available resources. The next stage is business process modeling and it involves gathering enough detail to understand how the process works. The business process within the company is then implemented and carried out by monitoring, where key performance indicators (KPI) are monitored. The collected data is analyzed to identify unexpected behavior, non-optimized flows, and based on this process is optimized.

3.1. Process orientation

There are many definitions of process orientation - Business Process Orientation (BPO). Bosilj Vukšić, Hernaus and Kovačič, in the book Business Process Management - Organizational and Information Approach, write how the term process orientation serves to describe an organization that emphasizes the holistic processes by which it manages the entire value chain of a product or service. Davenport describes process orientation as an integral part of structure, focus, measurement, ownership, and consumers (McCormack and Johnson, 2001). It is important to emphasize:

- how process orientation is not synonymous with process organizational structure. It represents an understanding of business and is only the first step towards a process-oriented organizational structure,
- process orientation and process organizational structure must not be confused with business process reengineering (BPR). Process orientation is the most important element of business process reengineering (Bosilj Vukšić et al., 2008), and unlike BPR, a process-oriented organization puts emphasis on global, social and technical aspects of human dynamics more than on technology, business tools and the technique itself – at the company level.

Increasing competitiveness in the market requires organizations to innovate to reduce the cost of doing business and meet the needs of consumers. The aim of introducing the concept of business process management is to optimize business processes while respecting the available resources. If the process orientation is taken into account, it is inevitable to adopt the consumer and his needs into the center of business. It can be said that the processes are structures used to

create added value for consumers (Lemańska-Majdzik and Okręglicka, 2015). Singh (2012) points out that organizations should have fewer than 15 key processes, which depends on the organization's activities. The processes should be as complex as possible. Process orientation shifts the focus from vertical management to horizontal management of business activities. The critical point of success of the process orientation is in the effort to change the attitude of employees towards hierarchy and functions so that they can pay all attention to processes and consumers (Childe et al., 1994).

Lindsay et al. (2003) defines changing company goals from the 1960s to the 21st century as follows:

- In the 1960s, the focus was on quantity,
- In the 1970s the focus was on cost,
- In the 1980s, the focus was on quality,
- In the 1990s, the focus was on the time needed to produce,
- In the 21st century, the focus is on how to provide more to consumers.

The development of the process approach has been observed since the beginning of the use of the term "system" in system theory, where each organization is seen as a subsystem that is part of a larger system – the economy. Such a principle is also used in process orientation where system theory is recognized in the part of process design where every activity, every employee and every resource is an indispensable part of the process as a larger system. Furthermore, Porter (2008) defined a company's success by gaining competitive advantage using the value chain concept. The goal of the Porter value chain is to determine which activities create a competitive advantage in order to keep them going, while activities that do not add value are thrown out of the chain. TQM – Totall Quality Management (Ahire et al., 1996) is the next stage of the development of the process approach. TQM is product quality management where errors are minimized and the entire organization, all employees are responsible for achieving the set quality. After that, there is a reengineering of business processes (Davenport, 1993) which represents a radical change in the business processes of the organization. Due to the high rate of inefficient reengineering, it is less used today. In the end, a new 6 Sigma philosophy (Antony, 2002) aims to reduce the number of product defects to 3.4 errors per million products. This philosophy is an extension of the TQM philosophy.

The process approach is applied in a process (horizontal) organization. A horizontal organization is an organization that directs its activities towards processes that create key added value for consumers. Horizontal organization is seen as a set of processes that require one or more inputs that create outputs for consumers.

Process diagrams show what employees are doing, step by step, according to the activities of the process. It should be borne in mind that process orientation and horizontal organization has its advantages and disadvantages. The advantages are shortening the duration of the process and more economical shaping of business processes, teamwork versus individual work, general knowledge of employees compared to narrowly specialized (this achieves a better insight into the business process and employees clearly see their roles in it) (Bosilj Vukšić et al., 2008). Whereas disadvantages are possible if key processes are not determined correctly, i.e. if the company's key processes do not overlap with consumer requirements. Another important disadvantage arises in the issue of management where managers no longer have authority over employees but their relationship is based on teamwork, the manager is seen as a coach (Bosilj Vukšić et al., 2008). Rentzhog , (2000) stresses the importance of information technology for a process-oriented organization because companies must keep pace with the development of technology if they want to achieve a competitive advantage.

The differences in characteristics between a traditional and process-oriented enterprise are numerous. It can be pointed out that due to the orientation to business functions, traditionally the company does not have a clearly defined picture of the entire process, is poorly focused on customers, there are unnecessary bottlenecks and barriers, poor communication and rivalry between organizational units, and conflicting goals and actions between different departments. In process-oriented companies, process focus ensures better focus on the customer, by establishing process boundaries, then customers and process suppliers, better communication is achieved, determining process owners who are responsible for the process avoids traditional division of responsibilities (Glavan, 2011). Although most existing organizations are built on the basis of a functional organizational structure, today a shift towards shallower, more horizontally oriented structures is necessary. Functions are the main building block in the functional organizational structure, and business processes take over the main role in the process organizational form. Functions still exist in a process-oriented organization, but their purpose is different, they try to meet the needs of business processes that create value (Bosilj Vukšić et al., 2008). Process-oriented organization is much superior to traditional, vertical organization and functionally oriented management, in this regard. That is why the need for transformation towards a process-oriented company is emphasized. Realizes that in the future the company will be able to gain a competitive advantage more easily if the business focus, structural elements, performance measurement systems, reward and advancement systems, communication and culture respond to the process approach (Kahrović, 2011).

4. METHODOLOGY AND RESEARCH RESULTS

Modern business trends, fierce competition and a turbulent environment are the main reasons for improving business processes and creating a competitive advantage. Factors such as increased operating costs, quality of products and services require management to introduce changes in the way work is organized, i.e. the implementation of process orientation in business. The idea of process orientation is not new. The goal of process orientation is to look at the organization from the consumer's perspective, to define which activities create added value products that meet their real needs. The purpose of process orientation is not to define a business process and those complete all the work because it becomes outdated over time and becomes bad. Once defined, the process should be subject to change and constantly reviewed by experts. Process changes should accompany changing consumer needs and should constantly look for opportunities for improvement. Every activity in an organization is part of a process, belonging to a process is defined according to the process hierarchy. Belonging to processes is a very important element from the point of view of employees because it accurately knows their role in the entire business system.

The purpose of the paper is to emphasize the importance of business process management in order to gain business excellence, and one of the main goals is to consider the impact of business process management on business excellence and to consider the level of process maturity of organizations in Serbia by examining the process orientation of these companies. The aim of the research is also reflected in the consideration of dimensions and highlighting weak links within dimensions that are not met by organizations operating in the territory of Serbia.

The subject of this scientific work will be the examination of the process maturity of companies in the Republic of Serbia. The survey included 73 organizations. The survey questionnaire, which was formed as a research instrument, was sent to the addresses of organizations operating in the territory of Serbia. The contact details of the companies were

found through the Business Directory of Serbia, the website www.preduzetniksam.rs, www.privredni-imenik.com and web presentations, because it was assumed that they were the most competent to fill them out.

The survey sample included 20 large, 50 medium and 3 small company and the survey consisted of two parts (A, B).

The first part of the survey (A) contained general questions or demographic issues that served as a basis for determining the characteristics of respondents and it is given in Table 1 with results of survey.

Table 1. Data based on the answers of respondents from the covered organizations to part of the general questions

Category		Σ(73)	
		number	percentage
1. The main activity of the organization:	Agriculture, forestry and fishing	**1**	**1.37**
	Sale of screw goods	**10**	**13.70**
	Construction works services	**5**	**6.85**
	Sale of building materials	**5**	**6.85**
	Sale of protective equipment	**7**	**9.58**
	Wholesale and retail trade, maintenance of motor vehicles	**13**	**17.81**
	Transport and storage	**3**	**4.11**
	Sale of rubber products	**10**	**13.70**
	Computer equipment maintenance services	**2**	**2.74**
	Wholesale and retail trade, sale of spare parts for motor vehicles	**10**	**13.70**
	Professional, scientific and technical activities	**3**	**4.11**
	Sales of confectionery products	**2**	**2.73**
	Health	**2**	**2.73**
2. The average number of employees:	Up to 50 employees	**20**	**27.39**
	Up to 250 employees	**50**	**68.50**
	More than 250 employees	**3**	**4.11**
3. The position of the examiner in organization:	Management	**42**	**57.52**
	Purchase	**7**	**9.58**
	Sales	**10**	**13.70**
	Production	**0**	**0**
	Maintenance Service	**14**	**19.20**
4. Years of work experience:	Up to 5 years	**3**	**4.11**
	From 5 to 10 years	**20**	**27.39**

	From 10 to 20 years	**30**	**41.10**
	Over 20 years	**20**	**27.39**
5. Gender of respondents in the organization:	Male	**45**	**61.64**
	Female	**28**	**38.36**
6. Headquarters of the organization in the Republic of Serbia:	Vojvodina	**10**	**13.70**
	Belgrade	**35**	**47.94**
	Sumadija and Western Serbia	**12**	**16.44**
	Southern and Eastern Serbia	**16**	**21.92**

Looking at the results of the survey, according to the number of answers, the most represented headquarters of the companies are located in Belgrade (47.94%), followed by Southern and Eastern Serbia (21.92%), Šumadija and Western Serbia (16.44%) and finally Vojvodina (13.70%).

The survey questionnaire was filled out mainly by persons who hold the position of management in companies (57.52%), followed by sales (13.7%) and procurement (9.58%). There were no respondents working in production.

61.64% of respondents are men, while 38.36% are women who work in jobs where the survey was conducted. In terms of work experience, most of those who have spent 10 to 20 years in companies (41.10%), while the least of those up to 5 years of work experience (4.11%). Equally represented in the percentage of 27.39 persons who are from 5 to 10 years of service, or over 20 years of work experience.

In the second part of the survey (B), there were questions that were tasked with determining the understanding of business processes and the direction of the organization and the individual in them, which are given in Table 2.

Table 2. Division of a group of questions from the survey (B)

	Number of questions
1. GROUP OF QUESTION– HUMAN RESOURCES MANAGEMENT	3
2 . GROUP OF QUESTIONS – STRATEGY AND POLICY OF THE COMPANY	3
3. GROUP OF QUESTIONS – PROCEDURAL ORGANIZATIONAL STRUCTURE	3
4. GROUP OF QUESTIONS– PROCESS ORIENTATION	3
5. GROUP OF QUESTIONS – CUSTOMER FOCUS	3
6 . GROUP OF QUESTIONS – PROCESSES IN RELATION TO SUPPLIERS	3

For the evaluation of questionnaires, a scale for process orientation was used with grades from 1 to 5 (1-not at all true, 2- not true, 3- is neither true nor false, 4- true, 5- completely true).

The data collected was processed with the help of Excel tables. The analysis and processing of data from the survey leads to next conclusions:

When it comes to the field of HUMAN RESOURCES MANAGEMENT (grade 4.06 – correct), it can be concluded that employees can be counted on to engage and achieve the set

goals of business processes. To constantly learn and to receive stimulation to meet the work norm.

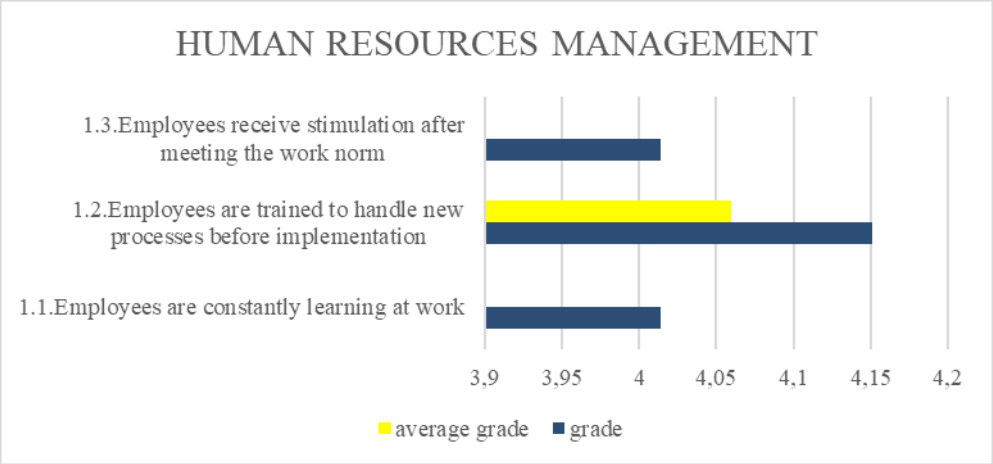


Chart 1. Human resources management

From the chart it can be concluded that employees in companies gave the highest rating to questions in the field of STRATEGY AND POLICY OF THE COMPANY (grade 4.62 – completely true) because the largest number of respondents was in the position of manager and at the same time it was noted that top management is actively involved and that it constantly monitors the improvement of business processes.

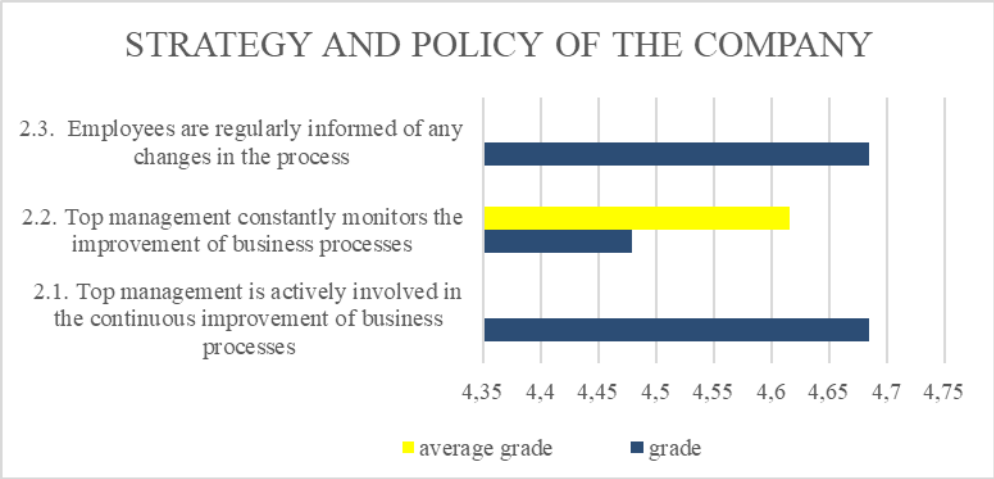


Chart 2. Strategy and policy of the company

Also, from Charts it can be seen that the PROCESS ORGANIZATIONAL STRUCTURE (grade 2.32 – not true) and PROCESS ORIENTATION (grade 2.33 – not true) are not yet clearly defined in medium-sized enterprises in Serbia and that employees do not understand who owns the process, the entrance – the way out, as well as the fact that business processes are not clearly defined. The only place where the claims are true is in a subgroup of PROCESS ORIENTATION issues, where the employee understands the work as a series of related processes.

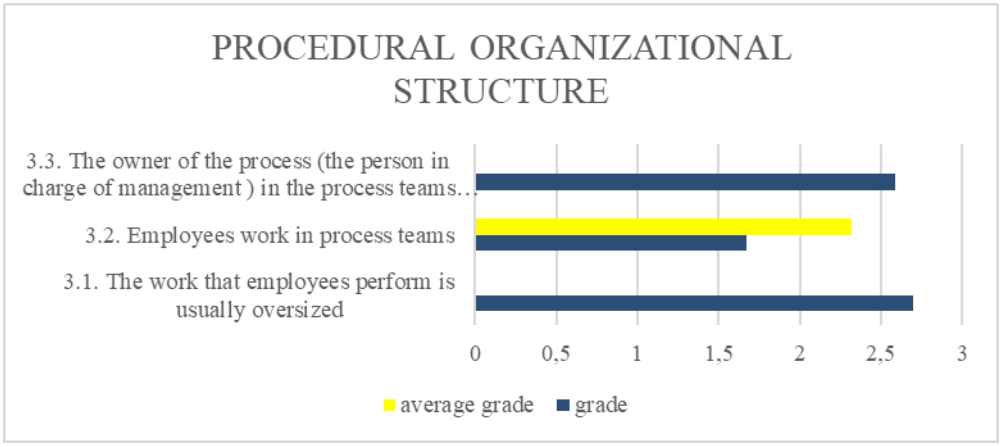


Chart 3. Procedural organizational structure

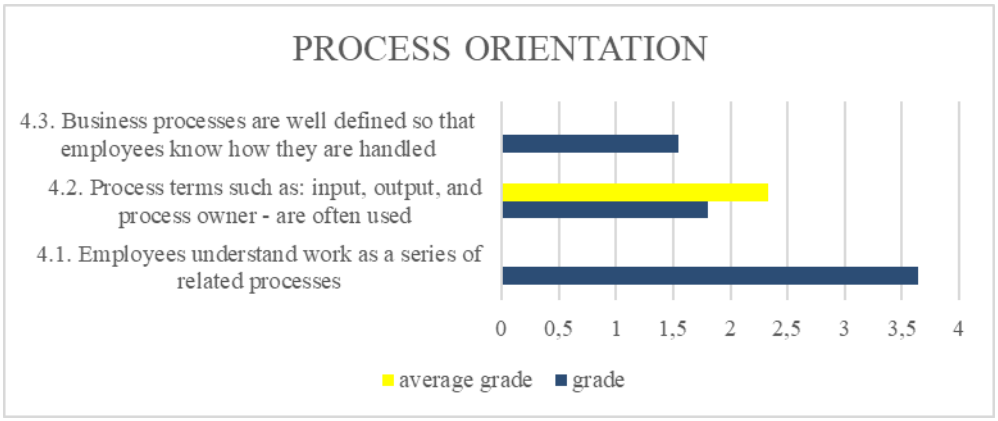


Chart 4. Process orientation

When it comes to the area of FOCUS ON CUSTOMER (grade 3.97 – true), it has been concluded that customer satisfaction is often and systematically evaluated and that customer feedback is used to improve processes in the organization.

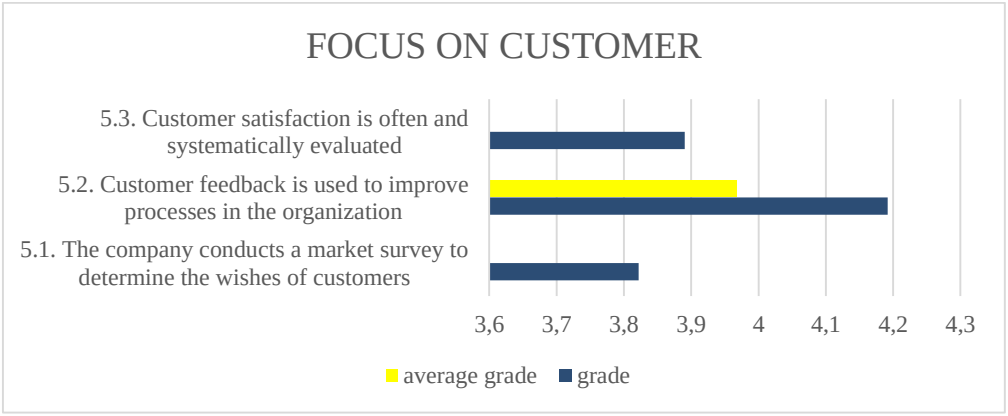


Chart 5. Focus on customer

Regarding the field of PROCESSES IN RELATION TO SUPPLIERS (grade 4.16 – true) it can be concluded that the company has long-term cooperation with clients and that at the same time they work closely together to improve the process.

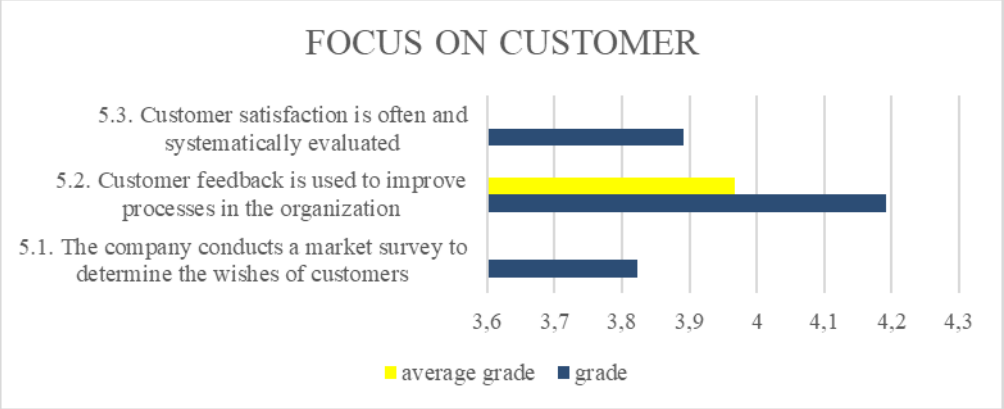


Chart 6**.** Processes in relation to suppliers

5. CONCLUSION

This paper represents a starting point in order to show the real state of process maturity in organizations in the Republic of Serbia. A literature search concluded that the topic of business process management is a poorly elaborated topic among the works of Serbian researchers. A much larger number of foreign works offer solutions from this practice. The issue of business process management has great potential and conclusions derived from research on this issue can significantly contribute in practice. The questionnaire was formed to conduct research on the aforementioned issues within micro, small, medium and large enterprises.

After conducting research in Serbia, where the focus was on medium-sized enterprises, awareness of business process management is still not clearly defined by production workers, unlike company management. In order for companies in Serbia to become as competitive as possible, it is necessary to constantly condition the acquired knowledge of employees. Organize or send employees to seminars in order to improve performance and create awareness of business process management, so that they become a daily practice and part of the business policy of all companies in Serbia.

The results of this scientific research work will contribute to the development of research representation of the concept of process orientation in the business practice of the Republic of Serbia. By determining the real situation, it is possible to determine what are the current shortcomings of business practices and propose measures to introduce improvements.

REFERENCES

Ahire, S. L., Golhar, D. Y., & Waller, M. A. (1996). Development and validation of TQM implementation constructs. Decision sciences, 27(1), 23-56.

Antony, J. (2002). Design for Six Sigma: a breakthrough business improvement strategy for achieving competitive advantage. Work study, 51(1), 6-8.

Becker, J., Kugeler, M., & Rosemann, M. (2003). Process Management: A Guide for the Design of Business Processes. Berlin: Springer.

Bosilj, Vukšić, V., & Kovačič, A. (2004). Business Process Management (in Croatian). Zagreb: Sinergija-nakladništvo d.o.o.

Bosilj, Vukšić, V., Hernaus, T., & Kovačič, A. (2008). Business Process Management - organizational and information approach (in Croatian). Zagreb: School book.

Davenport, T. H. (1993). Process innovation: reengineering work through information technology. Harvard: Business Press.

Dobrosavljević, A., & Urošević, S. (2019). Evaluation of performance orientation and process improvements in manufacturing organizations (in Serbian). Tehnika, 74(2), 287-294.

Glavan, L.M. (2011). Business process management in companies of the Republic of Croatia. Business and Economics Review, 31(1),105-125.

Harmon, P. (2003). Business Process Change – A Manager's Guide to Improving, Redesigning and Automating Processes. San Francisco: Morgan Kaufmann Publishers.

Hrabula, M., Opletalova, M., & Tucekc, D. (2017). Business Process Management in Czech Higher Education. Original Scientific Paper, 35-44.

Lagunda, M., & Marklund, J. (2005). Business Process Modelling, Simulation and Design. New Jersey: Pearson Prentica Hall.

Lemańska-Majdzik, A., & Okręglicka, M. (2015). Identification of Business Processes in an Enterprise Management. Procedia Economics and Finance, 27, 394-403.

Lindsay, A., Downs, D., & Lunn, K. (2003). Business processes—attempts to find a definition. Information and software technology, 45(15), 1015-1019.

Melan, E. H. (1992). Process Management: methods for improving products and service. New York: McGraw-Hill School Education Group.

McCormack, K. P., & Johnson, W. C. (2001). Business Process Orientation: Gaining the E-Business Competitive Advantage. New York: St. Lucie Press.

McCormack, K. (2001). Business process orientation: Do you have it?. Quality Progress, 34 (1), 51-58.

Ould, M. A. (2005). Business Process Management - A Rigorous Approach. Tampa: Meghan-Kiffer Press.

Porter, M. E. (2008). Competitive advantage: Creating and sustaining superior performance. Simon and Schuster.

Radović, M., Tomašević, I., Stojanović, D., & Simeunović, B. (2012). Process engineering (in Serbian). Belgrade: FON.

Rashid, N. K. (2003). Business Process Management – A Practical Guide. Tampa: Meghan-Kiffer Press.

Reijers, H. (2003). Design and Control of Workflow Precesses: Business Process Management for the Service Industry. Berlin: Springer-Verlag.

Rentzhog, O., (2000). Foundations of tomorrow's enterprise, Processes-oriented business philosophy (in Serbian). Novi Sad: Prometej.

Škrinjar, R., & Trkman, P. (2013). Increasing process orientation with business process management: Critical practices. International Journal of Information Management, 33, 48-60.

Singh, P. K. (2012). Management of Business Processes Can Help an Organization Achieve Competitive Advantage. International Management Review, 8(2), 19-26.

Tang, J., Pee, L. G., & Iijima, J. (2013). Investigating the effects of business process orientation on organizational innovation performance. Information & Management, 50(8), 650-660.

Vergidis, K., Turner, C. J., & Tiwari, A. (2008). Business process perspectives: Theoretical developments vs. real-world practice. International journal of production economics, 114(1), 91-104.

Vlahović, N., Milanović, L., & Škrinjar, R. (2010). Turning points in Business Process Orientation maturity model: An East European survey. WSEAS transactions on business and economics, 7(1), 22-32.

Vukšić, V. B., & Štemberger, M. I. (2010). Adoption of business process orientation practices: Slovenian and Croatian survey. Business Systems Research: International journal of the Society for Advancing Innovation and Research in Economy, 1(1-2), 5-19.

Volume XIX, Issue (1) (2023) 540-549

International May Conference on Strategic Management

THE IMPACT OF WEBSITE QUALITY ON USER SATISFACTION WITH E-COMMERCE SERVICES IN SERBIA

Jovan Stanojević[1*], Sanela Arsić[1], Đorđe Nikolić[1]

[1]*University of Belgrade, Technical Faculty in Bor, Bor, Serbia*

Abstract: The Internet, as we know it today, has significantly pushed the boundaries of traditional understandings and approaches in the study of information technologies. The rapid growth and development of the Internet caused changes in the way many business systems function. The role of the Internet has changed from one-way communication to two-way communication, which further led to an increase in the efficiency and effectiveness of the business systems of companies that increasingly apply modern information systems for electronic business in their operations. The subject of research in this paper will be the development of a structural model for examining the impact of site quality on electronic commerce services based on the attitudes and opinions of the selected sample. The software application smart PLS will be used to analyze the obtained results. The results of the research can be used as feedback in order to examine consumers' intention to use e-shopping services again.

Keywords: Internet, e-commerce, website quality, user satisfaction, smart PLS

1. INTRODUCTION

The trend of online shopping closely followed the development of the Internet and web technologies. The transition from static websites to dynamic ones marked the end of traditional business. One-way communication was replaced by two-way communication, which led to an increase in the efficiency and effectiveness of the business systems of companies that increasingly apply modern information systems for electronic business in their operations. This is about the trend of using modern programs, techniques, tools and methods to create interoperability of business based on the principles of the Internet. As such, the Internet has changed the outlook and ways in which today's business systems operate.

However, e-commerce, as an integral part of e-business, has brought with it many advantages, primarily the breaking of geographical barriers and access to the world market. This phenomenon gives the following results: lower business costs, the possibility of personalizing content, the time barrier for availability has been broken, etc. Although it sounds tempting at first glance, e-commerce carries with it certain risks. At the end of the day, however, customers are the most important link in business. They are the ones who buy our product or service, evaluate it and decide whether they will buy a product or service again through our online shopping platform. The quality of our e-commerce website plays a big role here. For this purpose, the subject of research in this paper will be the development of a structural model for examining the impact of site quality on electronic commerce services

[*] *Corresponding author: jstanojevic@tfbor.bg.ac.rs*

based on the attitudes and opinions of the selected sample, where the smart PLS software application will be used to analyze the results. The obtained results will be useful to researchers for further analysis and creation of a general picture of the state of consumers in Serbia who use e-commerce. In addition, companies that want to start e-commerce in this country, through the proposed website quality criteria that influence customers' intention to repurchase, can recognize key guidelines for the further development of their business.

2. E-COMMERCE

Most business models today are based on the principles of online commerce. There is an increasing number of companies that integrate their entire business into the online environment by applying the methods and techniques of web technologies. Here, first of all, we are talking about the transition from the traditional exchange of goods and services, face to face, to the exchange that is carried out through the presence of the Internet. Of course, we are talking about electronic commerce, which occupies an increasingly important place in society as a whole.

One of the first definitions of electronic business (e-business) was given by IBM in 1997. According to that definition, e-business represents the process of transformation of business processes in a company using Internet technologies (Radenković et al., 2015). Electronic business includes a wide range of possibilities and tools that today have significantly gone beyond the general framework of the given definition. With the dynamic development of technologies, it was clear that these boundaries would move significantly. One such definition builds on the previous one and describes e-commerce as "any form of business transaction in which both parties communicate electronically rather than through physical exchanges or direct physical contact" (Yu et al., 2011). The following definition is expanded to refer to e-business as a modern business tool that uses computers, the Internet, and common software technologies to exchange descriptions and illustrations of goods, offers, and procurement details, as well as other information that needs to be communicated to consumers, suppliers, staff, or the community. (Taher, 2021).

Today, electronic business in the broadest sense can be defined as an internal or external business process that is realized through a computer network (Radenković et al., 2015). The process of electronic commerce is closely related to electronic business, so it is important to note the difference between them. At first glance, these two terms can be identified by the fact that they both imply the mediation of the Internet, but in practice, this difference is more significant. In the past, the concept of e-business referred primarily to e-commerce, i.e. sale and purchase of products and services, providing services to customers, and cooperation with business partners (Radenković et al., 2015). Today, there is a somewhat clearer difference, because electronic commerce (e-commerce) is defined as a transaction over a computer network, and it includes the transfer of ownership or the right to use goods or services (Radenković et al., 2015), and is one of the constituent parts of electronic business. On the other hand, e-business includes numerous other business factors that are mutually interoperable and form a single business entity. This does not mean only buying and selling through other functions of the company, but the organization of the entire business of the company in a network environment.

When we talk about the advantages and disadvantages of electronic business, it is certainly clear that the number of advantages it provides for modern business is greater. This is supported by the fact that today there is a very large number of websites around the world that use this technology for their business. Namely, today it is not possible to trade without the presence of an online community that will buy those products or services en masse all

over the world. In this way, companies realize a significant potential for penetration into the world market in a relatively short period, because there are no geographical restrictions. In addition, they achieve significantly lower business costs, because they do not have to have a physical facility to serve their customers. Of course, there are significant other benefits such as laser market targeting, higher returns from advertising, ease to start and manage a company, etc. (Taher, 2021). From the buyer's point of view, these advantages are: ease and reliability of purchase, lower consumption of energy and time, expanded range of available products and services, as well as alternatives for those products or services, etc. However, not everything is so perfect. Online shopping entails significant risks such as the inability to test items firsthand before purchase, delivery delays, worse customer service, security of purchase and protection of personal data, and many others.

3. WEBSITE QUALITY INDICATORS & HYPOTHESIS

Each individual perceives a website in a unique way. For some, the most important criterion is the appearance of the website itself, while for others the security of purchase and protection of personal data is the most important thing. After all, it is impossible to satisfy the needs of each person individually. Theoretically speaking, with the development of technologies, it is artificial intelligence that has given us the possibility of personalizing content for each user according to his personal requirements, wishes and needs. However, in practice, it is not possible to achieve this. Also, brand loyalty is losing, while price and quality are the main attributes of value.

For this purpose, many serious companies continuously perform a detailed analysis of their past, current and future consumers. The most common method for this is surveying, which, with further statistical processing of the obtained data, can approximately determine the profile of the most likely type of consumer who will use our services or buy our products.

However, one of the main questions is being asked more and more often here, namely how and which criteria to choose for evaluating the quality of a website, in order to get good feedback from our users during the projection of our website on what should be paid the most attention to. The first official definition of website service quality was offered by Ananthanarayanan Parasuraman, Valarie A. Zeithaml, and Arvind Malhotra in 2002, who defined e-SERVQUAL as the degree to which a website facilitates the effective and efficient search, purchase, and delivery of products and services. (Demir et al., 2021). From this definition, six basic criteria for assessing the quality of a website emerged: availability of information and content, ease of use and usefulness, privacy, graphic style, up-to-dateness, and other criteria.

Analyzing the works of other authors, one of the studies on which this paper is based proposed the following criteria (groups) for assessing the quality of a website to examine consumers' intention to repurchase:

- Shopping convenience - Simplicity in terms of purchase has a very important effect on consumers, because it allows them to make a quick purchase.
- Site design - Represents the physical appearance of a website, and for some it is a crucial criterion for making a purchase decision.
- Availability of information - The volume of available information about the company, the product and the services that the website contains, can influence the consumer's perception of the seriousness of the company, and thus determine his decision to buy.

- Information Security - Every customer wants their personal information to be protected, and their purchase to be legal and safe without worrying about the possibility of data or money being stolen.
- Payment system - Today, one of the most important criteria that determines the quality of online shopping is the availability of a wide range of options for online payment.
- Communication with users - Leaving comments about the company and its products and services can contribute to the creation of a community of consumers who share their personal experiences and the experiences of others, while the company can use that for personal improvement and improvement.

On the basis of the set quality assessment criteria of the website, the following hypotheses were defined:

H1: Purchase convenience positively affects consumers' repurchase intention.
H2: Website design has a positive effect on consumers' intention to repurchase.
H3: The availability of information about products and services has a positive effect on consumers' repurchase intention.
H4: Information security has a positive effect on consumers' repurchase intention.
H5: Online payment systems on a website have a positive effect on consumers' intention to repurchase.
H6: Communication with users has a positive effect on consumers' intention to repurchase.

4. METHODOLOGY

The subject of research in this paper is the impact of website quality indicators on consumers' intention to repurchase. As the basic basis for this research, a survey questionnaire taken from the scientific work of Shin et al. (2013), was used. Based on a survey of final year students and master's students of the Technical Faculty in Bor, University of Belgrade, a survey was produced based on the previous one consisting of 46 questions, with a representative sample consisting of 205 respondents from the Republic of Serbia, of different genders, ages and educational backgrounds. structure, level of knowledge of computer work, etc. The questionnaire is made up of two parts. The first part contains 8 demographic questions, and the second part consists of 38 questions divided into 10 groups.

For this research, respondents' answers to the first 6 groups of questions were taken into account (respectively: Purchase practicality, Site design, Usability of information, Transaction security, Payment system, and Communication with users), which directly examines their influence on consumers' intention to repurchase shopping.

The main goal of this research is to examine how, and to what extent, the basic quality indicators of a website influence consumers to visit the website again, make online purchases and use the services it provides again.

Respondents' responses were recorded using a five-point Likert scale. The number 1 indicates "completely false" or "strongly disagree" and 5 "completely true" or "strongly disagree".

The results of the questionnaire for demographic data are given in Table 1, where it can be seen that the majority of respondents were male, 52.2%, while the rest of the respondents were female, only 47.8%.

Table 1. Demographic data of the sample

Demographic variables	Sample composition	
	Categories	Percentage (%)
Gender	Male	52,2
	Female	47,8
Age	18-30	69,8
	31-40	20,0
	41-50	8,3
	51 and more	2,0
Education	Incomplete or uncompleted elementary school	3,9
	Three-year vocational school or secondary vocational education	41,0
	Higher vocational education	22,0
	Higher professional qualification	33,2
Workplace	Private sector	20,5
	Public sector	11,2
	Unemployed	68,3
Computer skills	Weak	16,6
	Good	45,4
	Strong	38,0
Which site do you use most often for shopping?	limundo.com	22,4
	kupujemprodajem.com	16,1
	kupindo.com	10,7
	amazon.com	7,3
	sportsdirect.com	5,9
	sportvision.rs	4,4
	ebay.com	3,4
	Some other	29,8
Are you using the site for private or business purposes?	Private purposes	85,4
	Business purposes	14,6
What types of products do you buy?	Equipment	24,4
	Machines and tools	11,7
	Clothes	31,7
	Shoes	17,1
	Sports equipment	15,1

In addition to the above, it can be concluded that the majority of the sample consisted of a very young population of Serbia aged 18-30, with 41% having completed secondary vocational education, who are mostly unemployed or actively looking for work, know how to work on a computer, use online shopping services mostly for private purposes, and in as many as 31.7% of cases he buys clothes.

5. RESEARCH RESULT

SmartPLS is one of the prominent partial least squares structural equation modeling (PLS-SEM) software applications (Wong, 2013). It is often used in combination with other statistical tools and programs to evaluate the results of research conducted on a sample. One of the tools with which it is more often used is IBM's software package SPSS, which serves to additionally statistically process the data obtained by sampling.

In the program itself, there are two basic submodels in the structural equation model. The first is an internal model that specifies the relationships between the independent and dependent latent variables, while the second, the external model, specifies the relationships between the latent variables and their observed indicators. Also, it is important to note that in SEM, the variable is either exogenous or endogenous. An exogenous variable has path arrows pointing outward and none leading to it. Meanwhile, an endogenous variable has at least one path leading to it and represents the effects of another variable on it (Wong, 2013). It is a very useful tool for working with smaller samples, where there are no assumptions about the distribution of the data. In Figure 1, an example of such a model can be seen.

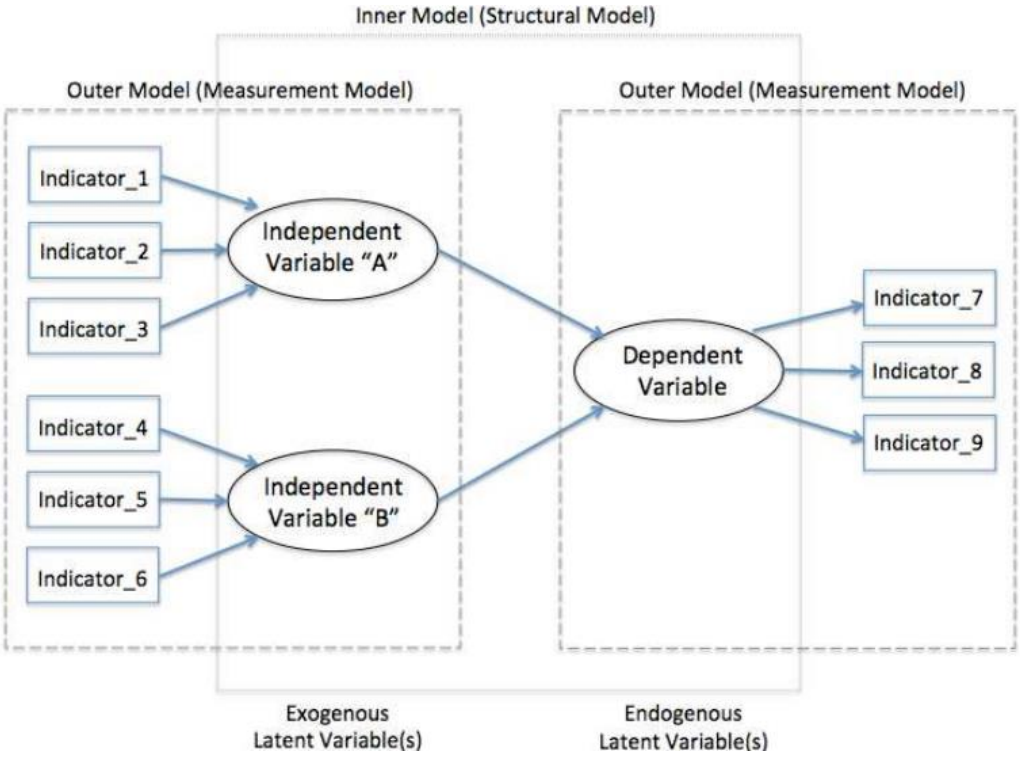


Figure 1. An example of a structural model (Wong, 2013)

Based on the defined research model, a structural model (Figure 2) was designed to test the set hypotheses about the impact of each of the website quality factors on consumers' intention to repurchase. The values in the circles represent the results of the Krombach Alpha test, while the values on the paths are as follows: the value of the standardized path for each criterion (t), and the p-value in parentheses.

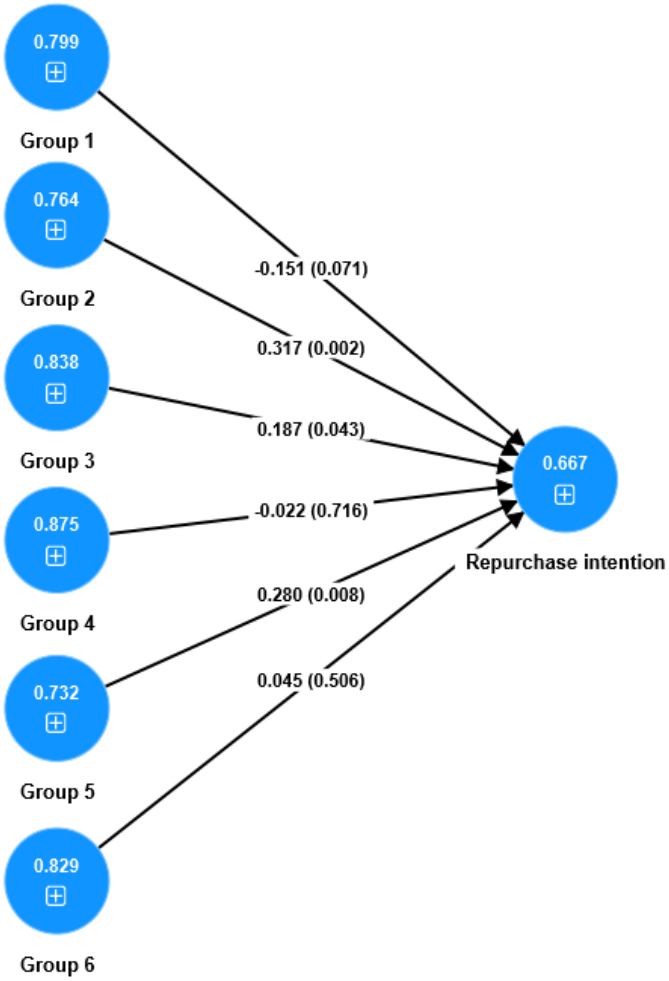


Figure 2. A Structural model for examining consumer repurchase intention

Conclusions on the acceptance or rejection of hypotheses using the PLS-SEM methodology are made in the following ways (Ramayah et al., 2018; Hair et al., 2019):

- The t-value must be greater than 1.96 for the hypothesis to be accepted.
- The p-value must be greater than the α/2 or α value, depending on whether a simple or multiple t-test is used.
- The standardized path coefficient must be greater than 0.1, for the hypothesis to be statistically significant, unless we use the Bootstrapping option.

Based on detailed analysis and data processing using the PLS-SEM method, the following data were obtained, for the significance level α=0.05, shown in Table 2.

Table 2. Standardized path coefficient of groups and repurchase intentions

Groups to Repurchase intention	Path coefficients
Group 1 -> Repurchase intention	**-0.151**
Group 1 -> Group 2	0.650
Group 1 -> Group 3	0.191
Group 1 -> Group 4	0.215
Group 1 -> Group 5	0.459
Group 1 -> Group 6	0.273
Group 2 -> Repurchase intention	**0.317**
Group 2 -> Group 3	0.477
Group 2 -> Group 4	0.314
Group 2 -> Group 5	0.228
Group 2 -> Group 6	0.058
Group 3 -> Repurchase intention	**0.187**
Group 3 -> Group 4	0.079
Group 3 -> Group 5	0.129
Group 3 -> Group 6	0.124
Group 4 -> Repurchase intention	**-0.022**
Group 4 -> Group 5	0.134
Group 4 -> Group 6	0.063
Group 5 -> Repurchase intention	**0.28**
Group 5 -> Group 6	-0.087
Group 6 -> Repurchase intention	**0.045**

These data indicate the relationship between the defined quality criteria of websites and the intention to repurchase. As it was already mentioned earlier, based on the given values of the path coefficient, we can immediately conclude that the values of the first ("Shopping convenience"), fourth ("Buying security"), and sixth ("User communication") groups of questions the same as the proposed reference value of 0.1. Based on that, hypotheses H1, H4 and H6 are not statistically significant, i.e. the practicality of the purchase, the security of the transaction and the communication with the users are not extremely important for the users during the purchase, and therefore, will not significantly affect their intention to buy again.

In addition to the above, if we go into a deeper analysis of the obtained results and apply the PLS-SEM model with the Bootstrapping option for several sub-samples, the following results are obtained (Table 3):

Table 3. Path coefficient using Bootstrapping option

Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
-0.151	-0.148	0.083	1.807	0.071
0.317	0.317	0.101	3.153	0.002
0.187	0.185	0.092	2.028	0.043
-0.022	-0.017	0.062	0.364	0.716
0.28	0.276	0.106	2.657	0.008
0.045	0.062	0.068	0.666	0.506

Based on the data of the analysis carried out by this method, it is seen that, as in the previous case, the hypotheses about the influence of the practicality of the purchase, the security of the transaction and communication with the users on the intention to buy again are rejected. We concluded this based on the values found in the column for the T statistic. Namely, the t-values for H1 (1.807), H2 (0.364) and H3 (0.666) are less than the reference

value t (1.96), so we conclude that the given criteria are not statistically significant, and the hypotheses are rejected.

In the very end, hypotheses H1, H4, and H6 are not statistically significant for consumers' intention to repurchase. Other hypotheses H2, H3, and H5 are accepted and statistically significant. This indicates to us the fact that the intention to repurchase is significantly affected by website quality criteria such as site design, the usability of information, and payment systems. This study gives us a broader picture of the habits and customs of customers in Serbia, mainly in the region of Eastern Serbia. However, this is not the only country where this is the case. Namely, according to Nicholas et al. (2019), customers from North and South America also pay a lot of attention to the quality of website design, while for customers from Europe, Asia and Australia, online service (communication, payment systems) is the most important, and design quality is less important. This further confirms hypothesis H1 and shows that site design is a predominantly universal quality criterion and has a positive impact on customers' desire to use e-commerce again. In addition, the research of the authors Pham & Nguyen (2019) showed that people who use the services of travel agencies in Vietnam express the intention of repeat purchases on sites that are mostly easy to use and provide information of relevant importance in terms of prices (price comparison). That is, the criterion of the practicality of purchase has a direct influence on the intention to buy again, which contradicts this study (H1), while other quality factors such as design, security, service quality, price, etc., indirectly influence the evaluation of the quality of the website. And the intention to repurchase.

6. CONCLUSION

This study shows us the situation of the average consumer in Serbia who engage in online shopping. Based on the data collected through the survey and the structural model, it can be seen how the criteria for assessing the quality of the website (respectively: Practicality of purchase, Site design, Usability of information, Transaction security, Payment system, Communication with users) can significantly influence the intention of consumers to make online purchases again. shopping. However, even though e-commerce in Serbia has progressed a lot in the last few years, there is still a lot of room for improvement, as indicated by the research results accompanied by the defined hypotheses.

A greater number of respondents use domestic websites to make their purchases because the relationship between the average purchasing power of an individual and the availability of certain products and services for personal needs, can be purchased on the domestic market. However, it should not be overlooked that customers return the most to shopping sites that have a good design. This indicates to us that the criteria of practicality of purchase, transaction security and communication with users are largely neglected by consumers from Serbia. The reason for the emergence of this trend is the increasing need of people in Serbia to make purchases on websites that, with their innovative design, create a general feeling of security and trust for making purchases. Websites that are beautifully designed are more attractive because they are easy to use, the functions are precisely and clearly defined, each relevant element of the purchase is clearly indicated and users can easily access the desired content. This data is not surprising, which was confirmed by the second hypothesis. Of course, hypothesis H3, which states that the availability of information about products and services positively affects consumers' intention to repurchase, is confirmed by this study, because the lack of information about products and services arouses great doubt and uncertainty among consumers, which can directly distract them from purchasing. Also, hypothesis H5 states that lower standards condition the need of people in Serbia to access a

wider range of payment methods for their purchased goods, because goods on the Internet often have to be paid for by card or some other virtual payment order, which is not suitable for all people, mostly older age. Communication is not imperative for consumers. It happens every day that they are ignored by the support team, which creates a negative trend of avoiding direct communication with them. These problems can be solved by applying more modern Internet technologies accompanied by the development of artificial intelligence (Chat Bot, VPN security, Cloud services, ESET,...).

The conducted research also has some limitations. Namely, the study was conducted in a short period of time and was not focused on a particular type of e-commerce site, which means that the generalization of the obtained results can be taken with a grain of salt. Also, focusing on recent research, another set of criteria can be taken for analysis, which would expand the literature in this scientific field. Although conceived in this way, the study can be further improved by taking into account a larger number of respondents at the national level, which would provide a realistic picture of how far e-commerce in Serbia has actually progressed, as well as how important the mentioned indicators of website quality are really when shopping online.

REFERENCES

Demir, A., Maroof, L., Sabbah Khan, N. U., & Ali, B. J. (2021). The role of E-service quality in shaping online meeting platforms: a case study from higher education sector. Journal of Applied Research in Higher Education, 13(5), 1436-1463.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European business review, 31(1), 2-24.

Pham, H., & Nguyen, T. (2019). The effect of website quality on repurchase intention with the mediation of perceived value: The case study of online travel agencies in Vietnam. Journal of Global Business Insights, 4(1), 78-91.

Radenković, B., Despotović-Lazić, M., Bogdanović, Z., Barać, D., & Labus, A. (2015). E-business. Serbia: University of Belgrade, Faculty of Organizational Sciences. (In Serbian)

Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Memon, M. A. (2018). Partial least squares structural equation modeling (PLS-SEM) using SmartPLS 3.0: An updated guide and practical guide to statistical analysis (2nd ed.). Kuala Lumpur, Malaysia: Pearson.

Shin, J. I., Chung, K. H., Oh, J. S., & Lee, C. W. (2013). The effect of site quality on repurchase intention in Internet shopping through mediating variables: The case of university students in South Korea. International Journal of Information Management, 33(3), 453-463.

Taher, G. (2021). E-commerce: advantages and limitations. International Journal of Academic Research in Accounting Finance and Management Sciences, 11(1), 153-165.

Wilson, N., Keni, K., & Tan, P. H. P. (2019). The effect of website design quality and service quality on repurchase intention in the e-commerce industry: A cross-continental analysis. Gadjah Mada International Journal of Business, 21(2), 187-222.

Wong, K. K. K. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. Marketing Bulletin, 24(1), 1-32.

Yu, X., Guo, S., Guo, J., & Huang, X. (2011). Rank B2C e-commerce websites in e-alliance based on AHP and fuzzy TOPSIS. Expert Systems with Applications, 38(4), 3550–3557.

Volume XIX, Issue (1) (2023) 550-561

International May Conference on Strategic Management

SMART AGRICULTURE IN ALBANIA

Oltjana Zoto*, Silvana Nakuci, Fatmir Guri

Agricultural University of Tirana, Albania

Abstract: The application of information and communication technologies in machinery, equipment, and sensors for agricultural production systems is known as smart agriculture (SF). This evolution is anticipated to advance with the introduction of more robots and artificial intelligence into agriculture thanks to new technologies like the Internet of Things and cloud computing. The two objectives of this study are to: 1. identify the scientific information on SF that is present in the scientific literature and 2. summarize the current views of SF in Albania from the viewpoint of the specialist in this field.
A semi-structured interview with an agricultural specialist was conducted as part of the research. Much foreign and Albanian literature on the topic under study was used. One of the primary factors restricting SF's evolution was the integration between various systems on the market. Farmers' education, skill level, and knowledge of SF tools are further constraints. These restrictions enabled businesses to study and aid in solving these issues, and science can play a role in this process. The nations that will lead the way in smart agriculture invest more in research and development and produce more publications. Understanding the issues in agriculture and how the advancement of technology affects agricultural development was made possible by the complementary application of both research approaches.

Keywords: smart agriculture, technology, agricultural sector, market

1. INTRODUCTION

The agriculture industry has significantly transformed in recent years thanks to technological advancements, including electronic systems and data transfer. In order to make decisions about production and the related strategic and management concerns, these changes necessitate updated information from production systems, markets, and agents involved in production.

Smart farming (SF), integrating ICTs into agricultural production systems' machinery, gadgets, and sensors generates a sizable amount of data and information. In order to combine and evaluate diverse farm data for decision-making, smart Farming relies on data transmission and centralization in remote storage systems.

Researchers have focused on demographic trends because labor shortages may contribute to agricultural inadequacy. These patterns include an aging population and the ongoing migration of individuals from rural to urban areas. Along with these patterns, escalating climate change will keep changing growth conditions, including temperature, precipitation, and soil moisture, in unpredictable ways. SF tools can aid in minimizing

* *Corresponding author: ozoto@ubt.edu.al*

environmental restrictions and reducing, stabilizing, or maintaining these impacts in agricultural activities.

It is predicted that between 2009 and 2050, there should be a 70% rise in global food consumption due to the ongoing food shortage and population expansion. In order to meet the task of expanding food production in the face of limitations like climate change and other environmental challenges, SF-related technologies will be essential.

1.1. The current state of agriculture in the world

World agriculture in the 21st century faces the two biggest challenges: how to feed ourselves. At the same time, we have an increase in the world population which contributes to the high level of rural poverty and how to manage natural resources.

More than 60% of people's food in rural areas comes from their production (only 40% is bought from markets). Nearly 90% of people's food in metropolitan areas is procured through markets.

According to this statistic, 90% of the food produced worldwide is consumed in the nation where it was grown. The production systems in the locations where people will live must account for the majority of the growth in food production if this trend is to continue.

By 2050, it is anticipated that there will be over 10 billion people on the planet, which will result in a 50% increase in agricultural demand from 2013.

Varying countries see a varying rate of decline in agriculture's employment and economic contribution. The spread of transboundary pests, plant, and animal diseases, some of which are becoming resistant to antimicrobials, the growth of greenhouse gas emissions, deforestation, and land degradation are harming productivity even though investments in agriculture and technological advancements are increasing yields. These factors contribute to biodiversity loss, natural resource degradation, and the effectiveness of pest control.

The frequency and severity of conflicts, crises, and natural disasters are rising. As a result, there are more poor people, more migrants, and more people needing humanitarian aid. They also decrease food availability, obstruct access to food and healthcare, and damage social protection institutions. According to (Binswanger-Mkhize et al., 2010), the proportion of undernourished people in low-income, protracted crisis nations is typically 2.5 to 3 times greater than in other low-income countries.

1.2. The current situation of agriculture in Albania

24% of the land in Albania is still used for agriculture, making it one of the country's largest and most significant economic sectors. One of the first regions in Europe to be exploited for agriculture is said to be the south-east of Albania.

The National Institute of Statistics (*Instat*, 2022)states that agriculture accounts for 20% of GDP in Albania, which is higher than other EU nations, where it accounts for only 2% of GDP and 6% of employment (according to Eurostat data).

Albania is a relatively small country, with a pronounced mountainous relief and a population of about 2.8 million inhabitants (*Instat*, 2023) .Only 24% of its land is classified as agricultural land, 36% is forest, and 15% is pasture. Still, agriculture constitutes the income base for most of the population and is a source of employment. The rural population is estimated to be about 54% of the total population, while more than 60% of the workforce works in agriculture and related fields.

Imports, for various reasons, dominate the market, and locals do not use the land. One of them is the shortage of funding and investments in this field. Albania is a beautiful place to invest in the agricultural sector because of its pleasant climate and inexpensive rural labor.

The industry has generally experienced low levels of investment interest, which is mainly attributable to some problems, including migration from rural areas, subpar product marketing, inadequate irrigation and drainage systems, a lack of technological solid and infrastructure, poor farmer organization, and a lack of development in the processing sector, among others.

1.3. SMART Farming

With the introduction of informatics technologies and data transfer from agriculture, SMART Farming emerged from software engineering and computer science.

There are more terms with related meanings used in the SF field. Deriving from the farm management information system (FMIS) principle, there have been concepts like precision agriculture and agricultural management information systems. According to (Wolfert et al., 2017), FMIS is a system created to gather, process, store, and distribute data in a format necessary to carry out activities and functions on rural lands. The use of sensors in agriculture makes SF tools feasible. An electrotechnical device known as a sensor turns physical quantities from the environment into a signal that an instrument can interpret. Temperature, humidity, light, pressure, noise level, the presence or absence of specific objects, mechanical stress levels, speed, direction, and object size are among the measures the sensors can read.

The phrase "Internet of Things" (IoT) is also significant. This phrase refers to one of the SF technologies that British businessman Kevin Ashton introduced in 1999 and shared the idea of an intelligent environment with FMIS. The Internet of Things (IoT) offers prospects for more direct integration between the real world and computer-based systems by enabling remote control of things through the existing network infrastructure.

IoTrelies on Internet infrastructure, which has drawbacks, particularly when managing numerous network devices and connecting with other systems. Robotics, mapping and geospatial technologies, decision-making, and statistical procedures are just a few of the technological advancements that SF tools provide to agriculture.

Advances in sensor, data analysis, telemetry, and positioning technologies are among the most promising SF technologies, but they may take some time and money to develop and implement.

One of the debates over new technologies results from Schumpeter's research, which focused on the innovation-related core of economic progress. Technological innovation alters production processes and can determine how economically developed a region, or a nation is.

Following that, Freeman (1986) presented the idea of the techno-economic paradigm. According to this perspective, technology has economic and social implications besides being a research or engineering subject. When technological paradigms are disrupted, new products and processes are introduced, leading to structural changes in society and the adoption of more productive and valuable production techniques.

The current application of cloud computing and the Internet of Things in intelligent surroundings has the potential to create a new techno-economic paradigm. However, to alter the techno-economic paradigm, R&D investments are required. Different levels of technology accumulation, technological efficiency, and cutting-edge research methodologies exist when comparing regions and nations. The World Bank reports that in 2013, public and corporate

R&D investment spending was concentrated in severalcountries, notably South Korea (4.15%), Japan (3.47%), Denmark (3.60%), Germany (2.85%), and the USA (2.81%).

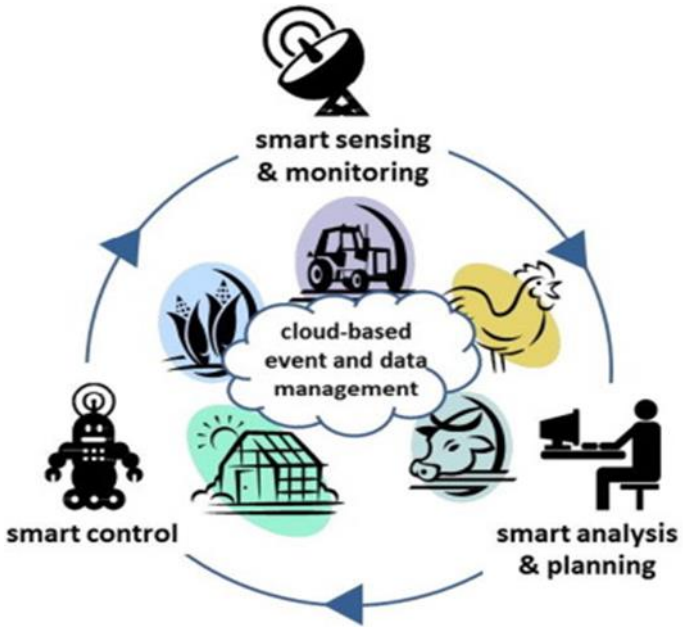


Figure 1. SmartCyber management cycle in Smart Farming

1.4. Smart Farming in Albania

According to the World Bank, Albania's agricultural industry suffers several difficulties, including tiny farms and fragmented land, insufficient infrastructure, market limitations, restricted access to loans and subsidies, and deficient rural institutions. Albania has received funding from the World Bank for several initiatives. By boosting small farmers' incomes and generating jobs for those in need in rural regions, they have positively impacted the decrease of poverty. In Albania, irrigation and drainage systems have been repaired or upgraded across over 335,000 hectares. Two-thirds of the irrigated land belongs to Thire, and thirty-three dams have undergone rehabilitation.

The irrigation programs have assisted more than 100,000 families. In 380 villages and eight districts, the microfinance program provided 47,000 loans for businesses that generate income. The growth in rural revenue was influenced by the assistance provided to farmers in marketing and production. Four wholesale markets were constructed in Korca, Lushnje, Vlor, and Shkodr as part of a World Bank-funded initiative, enabling the marketing of regional agricultural products. A total of 145 grants were given to farmers, exposing 20,000 to new technologies. The difficulty is in making agriculture a modern, commercial, and competitive enterprise while encouraging alternate sources of income for rural populations who want to leave the sector.The ongoing Water Resources and Irrigation Project (WRIP) aims to improve irrigation system performance and sustainability in the Drini, Buna, and Semani river basins and implement integrated management policies and river basin management plans. It also aims to strengthen government capacities to manage national, river basin, and local water resources.

1.5. Agricultural research and technology transfer

Until the middle of 2006, the Ministry of Agriculture and Rural Development had nine research institutes. The object of work in agricultural research has been to increase the role and effectiveness of agricultural research in implementing the strategy and policies for developing agriculture in the country. With VKM No. 515, dated 19.07.2006, "On the restructuring of research-scientific institutes under the Ministry of Agriculture and Rural Development,"based on the merger of 6 of the research institutes, five agricultural technology transfer centers (QTTB) under the ministry were created relevant: in FushëKrujë, Vlorë, Shkodër, Lushnjë, and Korçë. From this restructuring, two of the existing institutes (Institute of Animal Husbandry Research - IKZ and Institute of Vegetables and Potatoes - IPP) were moved respectively to QTTB Fushë-Krujë and Lushnjë.

This restructuring was accompanied by a change in future work objectives, emphasizing the transfer of technologies following regional needs, conditions, and priorities. Among the most critical problems facing the advisory service, we can mention: (i) the limited number of extensionists (on average, one extensionist for 2000 farmers) and their engagement with numerous tasks outside their field; (ii) providing the necessary financial support in the form of investments for agricultural information centres and operating expenses for the implementation of advisory activities.

1.6. The research problem and why this issue is being studied

The agriculture sector in Albania suffers several difficulties, such as small farm sizes and fragmented land, poor infrastructure, market limitations, restricted access to grants and loans, and inadequate rural institutions.

With the increase in population and the movement towards urban areas, the demand for agricultural products has increased. Agricultural land is limited and natural resources are limited, so it is necessary to adopt agricultural technology that leads to increased production.

In many developing countries, increased production has been achieved without new technology but by expanding cultivation on previously used productive land. There is no more room for further improvement, and it is necessary to use technology resources to increase yield.

The main objective of this paper is:To analyse the Impact of the development of technology in agriculture and the obstacles to adopting these technologies in the agricultural sector.

During the further analysis of the problem under consideration, we will be able to give you answers to the following research questions:

- Has the development of technology had an impact on the increase in production, on the farmer's income, and also on his cost?
- What is the profile of the farmer who implements these technologies, and what obstacles do not make it possible to adapt the technology in agriculture?

In the conducted study, we raised two hypotheses that will be proven, and the answer will be given in this study:

- The development of technology has an impact on the increase in the production of agricultural products and on the farmer's income.
- Implementing technology in agriculture will increase unemployment in the country and the farmer's costs.

2. LITERATURE REVIEW

Concerning SF,a diversity of terms can create an imbalance between technology, management, and the environment.

The term "Internet of Things" appears more often in publications. This term seems increasingly frequently in SF-related publications (especially after 2010) and is associated with research on communication between physical objects and computer systems. The term "big data" is recent in the literature and has received attention from researchers. This term concerns technology and electronics and is related to SF. Big data refers to an increase in the volume of data, which ischallenging to store, process and analyze through traditional database technologies (Hashem et al., 2015)**.** The term "sensor" wireless" appears in the third position in the "technology and electronics" factor. This term emphasizes the change in data storage and transmission technology, previously perms of memory cards, for the transmission of data remotely. Tools are possible due to using sensors in agriculture (Lehmann et al., 2012).

"Cloud computing" technology enables the use of SF. This term appeared for the first time in 2011. This area requires more attention, especially regarding the security and privacy of stored data.

One of the objectives ofdeveloping and distributing SF technologies is to minimize the adverse environmental effects caused by agriculture and livestock.

Towards smart agriculture: agriculture embracing the vision of IoT in the country with the most significant number of publications analyzed is China (31.84%), followed by the United States (8.94%) and South Korea (8.38%). The most frequent factor Japan developed was "technology and electronics." Japan has a small agricultural area, but based on the data, there is a high level of R&D in agricultural technology. South Korea is similar to Japan. However, these countries have large companies and technology research centers, especially in the computer and electronics sector, making their development and studies related to agriculture important.

Some Japanese technology firms, such as Fujitsu, have advised farmers with their farming systems. This firm collects data (rainfall, humidity, soil temperature) from a network of cameras and sensors nationwide to help farmers in Japan better manage their crops and expenses (Wolfert et al., 2017)**.** After analyzing the countries that are leaders in these technologies, it is worth noting that they have the most significant R&D investmentsglobally. Israel ranks first with 5.44% of GDP,South Korea invested 4.81% in R&D in 2020, and Japan spent 3.26% of its GDP in R&D, etc. (The United Nations 2022).

From a business perspective, farmers are looking for ways to improve profitability and efficiency, on the one hand, by looking for ways to reduce their costs and, on the other, by getting better prices for their produce. Therefore, they must make better, more optimal decisions and improve management control. While in the past advisory services were based on general knowledge that used to flow from research experiments, there is a growing need for information and knowledge generated on the farm in its specific local context. Big Data technologies are expected to help achieve these goals better (Poppe, K. et al., 2015)**.**A particular circumstance for agriculture is the Impact of the weather and especially its volatility. Specific data on local weather and climate can help a lot in decision-making. A general driver can be the simplification of paperwork due to all kinds of regulations in agro-food production (Poppe et al., 2015).

From a public perspective, global food security is often cited as the main driver for further technological advances (Poppe et al., 2015). Furthermore, consumers are becoming concerned about food safety and the nutritional aspects of food concerning health and well-

being (Tong et al., 2015). Related to that, Tong et al. (2015) mention the need for early warning systems instead of the many ex-post analyses of historical data.

A general development in the future is the Internet of Things (IoT), in which all kinds of devices - smart objects - are connected and interact with each other through local and global network infrastructures, often wirelessly (Michael& James, 2014).Precision agriculture is an exponent of this development and is often cited as an essential driver for Big Data (Michael &James, 2014). This fact is expected to lead to radical changes in farm management due to access to clear information and decision-making skills that were previously not possible, technically or economically (Sonka et al., 2014). Consequently, many ag-tech enterprises have a rise that furthers this data-driven development (Wolfert et al., 2017).

Wireless data transfer technology also allows farmers to access their data from anywhere - whether they are on the farm or meeting with buyers in different locations - enabling them to obtain information about the crop yield and harvest and best to make decisions about bringing their product to market (Faulkner, A et al., 2014).

In the analysis of (Roy & Doss, 2007), in determining agricultural technology adoption by farmers, the first thing to consider is whether adoption is a discrete state with a binary response variable. This fact means that it depends on whether the farmer is a technology adopter or a non-adopter that takes values o and 1.

A farmer was defined as an adapter if he was found to be growing any improved material, i.e., improved seed using chemical fertilizers. This approach is most suitable when farmers grow either local or improved varieties. Suppose the exciting aspects of adoption are situations where farmers are planting more and more land to enhance types while some local varieties continue to grow. In that case, a continuous measure of adoption is more appropriate (Roy & Doss, 2007).

Agricultural technologies include improved techniques and practices that affect increased agricultural production. Some of them are high-yielding varieties of seeds, chemical fertilizers, pesticides, and the use of machinery. Thanks to improved input/output relations, the new technology tends to increase production and reduce the average cost of production, bringing significant gains in farm income. Adaptors of improved technologies increase their output, increasing productivity (Jain et al., 2009).

In a broader sense, scientific studies aim to analyze the decision process of farmers in adopting new agricultural technologies in their agricultural lands or not adapting them. As noted in the literature, various factors determine the adoption of multiplefarming innovations and technologies.

Improving farm-level resilience to shocks to agricultural production is essential to reduce poverty and improve household food security in all developing countries, especially in areas at high risk of climate shocks and with a high proportion of the population dependent on agriculture. The study by (Bakker et al., 2005) shows that one of the leading causes of household food insecurity is the risk of agricultural production failure due to drought, resulting in reduced harvests and farm incomes. But it is well known that low productivity leads to low yield.

But have the poor people benefited from new agricultural technology?For many, the main question remains: to what extent and under what circumstances did poor people benefit from new agricultural technologies? Estimating this "distributive" Impact of new technology is challenging. Propositions about the Impact of distribution are therefore carefully specified, and any assessment of the final Impact should not be based on the pattern of adaptation seen in the first years after the release of the technology (Rogers et al., 2001).

Among the most useful (but rare) assessments of the Impact of technology on poverty are those that follow the experiences of farming communities over a more extended period (Herdt, 2010).

These studies show that poor people have benefited from new technologies, mainly through increased employment opportunities and higher wage levels.

Figure 2. The benefits that come from the development of technology(Lanjouw & Lanjouw, 2001)

How do the poor benefit from new technology? Many factors affect how much the poor benefit from changes in agricultural productivity by adopting new technology. These are discussed below, starting with the two most important factors - impacts on employment and food prices.

Adopting rice and wheat varieties generally increased labor demand due to higher harvesting requirements associated with higher yields:

- Most additional works was hired rather than family work (Islam et al., 2021). This fact is significant for the poorest
- The increase in labor demand was more significant when new varieties were introduced in areas with high potential and were often accompanied by increased harvesting intensity. The Impact was less pronounced in areas with low potential (Otsuka, 2000).

3. METHODOLOGY USED IN THE STUDY

3.1. Data used

Both primary and secondary sources of data were utilized. The primary information on the Impact of technology development in agriculture, the factors that affect how these technologies are adopted, and whether new technology increases or decreases a farmer's income and costs was obtained from an interview with an agricultural expert. The secondary data were provided by reviewing the literature of local and foreign authors, which aimed to identify all the problems mentioned above.

3.2. The method used

Descriptive and analytical methods were used in this paper. In the first part of the paper, some problems related to agriculture worldwide and in our country have been identified—also issues of Smart Farming. Literature from foreign and domestic authors was used on the problems of the analysis under consideration. A destructive descriptive analysis was also carried out from the interview with the agricultural expert who made an essential contribution to the work on the problems and the current situation facing agriculture in our country today.

4. RESULTS AND INTERPRETATIONS

4.1. The Development of Technology and its Impact on Agriculture

Fertilizer increases the advantages of adopting improved (hybrid) seed, particularly in a suitable environment (Church et al., 1998). How quickly results are attained as a sign of the most significant potential economic rewards is crucial in the time needed for technology generation. Because they can be invested more quickly to generate more returns, today's profits are more valuable than those obtained tomorrow (Alston et al., 1998).

Adoption research also discovered and characterized five sorts of adopters in a social system. According to (Mosher et al., 1992), groups included innovators, early adopters, the early majority, and the late majority. According to a study by Maddux & Rogers (1983), who described the traits of these categories, most early adopters are predicted to be young, more educated, daring, and willing to take risks. Late adopters are expected to be older, less knowledgeable, more traditional, and risk-averse than this group.

To introduce planned innovation, it is necessary to categorize adopters into five categories, according to a study by (Runquist & Crook, 1984).

It has taken a lot of work to pinpoint the many phases of the decision-making process. The decision to adopt an innovation is described as a mental process by studies Shoemaker, (1997) and Maddux & Rogers, (1983), which span from the moment an invention is first learned about to the choice to accept or rejected it. The study also demonstrated how the decision-making process for adopting innovations differs from that for diffusion.

The former occurs inside a person's head, whereas the latter occurs amongst social system members or within a territory. Based on this theoretical framework, the study identified five steps in the adaption process: 3. An assessment or determination of whether to approve the innovation. Awareness or initial knowledge of the invention. Interest in and belief in creation. 4. the need for judgment and validation of the chosen course of action; and 5. adaptation.

These stages of the diffusion process indicate a lag between awareness and adaptation, typically calculated from initial information until the decision to adapt. As a result, adaptation is not a behavior that occurs at random but rather is the outcome of the series of events that occur during these stages of adoption (Maddux & Rogers, 1983).

The creation and distribution of enhanced technologies to users (such as farmers) and their availability determine the rate and speed of adoption of better technology. Technology is depreciating and improving, an exciting process. (Alston et al., 1998).

4.2 Results and Discussions from the expert interview

In order to better understand the situation of agriculture in Albania, how is the current situation in agriculture, and what types of technological tools are mainly used in the

cultivation of agricultural products, a semi-structured interview with a farming expert and small business manager for the production of fruit seedlings is conducted

For the first question on the development and application of technology in agriculture, the expert said: From year to year, technology in our agriculture has developed and continues to develop. Mainly its development has been felt in machinery for planting, fertilizing, mulching, irrigation, etc. The areas that apply these technologies more and have the most developed agriculture in our country are Lushnja, Korca, Shkodra, Lezha, and Berat.

The expert says the second question on the Impact of technology on increasing production and income: This new and slightly modern technology has influenced the increase in production, its quality, the reduction of the workforce, and the reduction of the time factor. The increase in production brings a reduction in the farmer's cost and also an increase in income. The well-being of the farmer is increasing compared to the previous years.

Question three has to do with the profile of the farmer who adapts these technological tools. The expert continues: Farmers are agriculture specialists, primarily: agronomists, biologists, and agricultural economists. This fact means that they know the field of agriculture well and know how to manage the risks that may arise while producing agricultural products. Most farmers are over 30 years old, and a small minority are under 30 and undertake the adaptation of these new technologies. This fact is confirmed by the expert expressed by his long experience in agriculture.

The obstacles to the adaptation of these technological tools by Albanian producers are several, according to the agricultural expert. The means for mechanization in every process, such as production and processing, are carried out in two private ways and through grants from public policies such as loans, land ownership, documentation, and the union (cooperation). If the farmers were united, they would have more chances for grants. These obstacles make it possible for farmers to be more rigid towards adapting new technological tools. Also, another negative phenomenon we can say is that agriculture is not supported by the young, well-educated with an agricultural profile, which means they have more information about introducing new technology in production and know how to take over risks that may arise during work and production processes.

The increase in unemployment due to the introduction of machine tools and the cost of the farmer, concerning these two phenomena, the agricultural expert says that an investment this year is a profit for the next year, so if we spend this year on a purchase of a new machine that will serve us during the cultivation of the land is, therefore, long-term capital and we cannot call this a cost for the farmer. Introducing new technologies has reduced the workforce because a machine can do a work process much faster than ten workers for a time even shorter than the labor arm. Thus, the number of workers has decreased, and the farmer's cost has also been reduced. We can say that wages are higher now per worker with the introduction of technologies. But this does not mean that agriculture does not need other jobs. Of course, agriculture remains a primary sector in employment and a priority for the future.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

During the work and analysis taken in the study, we reached some conclusions below:

- Our country's agriculture is only beginning to use SF technology, and various agents are looking for business chances in this industry. The supply and development of SF tools are presently concentrated on machinery and equipment. Businesses in this

industry are in charge of putting the first models into integrated farms based on observations of the deployment of these technologies in Albania.

- Technology development has a positive effect on the growth of production and higher quality; from this increase in production, we have an increase in farmers' income, and employees benefit from the development of technology through higher wages. Also, the cost for farmers is the lower it is.
- Another conclusion drawn from the analysis is that there are some obstacles to adapting these technologies, such as the low education of our farmers, limiting factors to understanding and adapting these technologies, the economic situation is also low and ownership of the land.

5.2. Recommendations

From the analysis made on the development of technology and the Impact it has on agriculture, we have resulted in some still unsolved problems, some of them may be:

- The state should be closer to farmers through subsidies for implementing new technologies that would simultaneously increase production and the adaptation of certified laboratories that enable farmers to meet the quality required by the EUto increase exports and avoid overproduction in the country.
- Public policies should create a fund where loans with minimal interest are offered through banks and microfinance institutions to give farmers more opportunities to get loans.
- Farmers must cooperate by creating small cooperatives; this makes it possible for the government to be more present to them, reduce production costs, increase productivity, and increase access to the markets of their products produced.

REFERENCES

Alston, J. M., Pardey, P. G., & Roseboom, J. (1998). Financing agricultural research: International investment patterns and policy perspectives. World Development, 26(6), 1057–1071.

Bakker, M. M., Govers, G., Kosmas, C., Vanacker, V., Oost, K. V., & Rounsevell, M. (2005). Soil erosion as a driver of land-use change. Agriculture, Ecosystems & Environment, 105(3), 467–481.

Binswanger-Mkhize, H. P., McCalla, A. F., & Patel, P. (2010). Structural Transformation and African Agriculture. Global Journal of Emerging Market Economies, 2(2), 113–152.

Church, M., Hassan, M. A., & Wolcott, J. F. (1998). Stabilizing self-organized structures in gravel-bed stream channels: Field and experimental observations. Water Resources Research, 34(11), 3169–3179.

Faulkner, A, Cebul, K, & McHenry, G. (2014). Agriculture gets smart: The rise of data and robotics.

Freeman, C. (1986). The diffusion of technical innovations and changes of techno-economic paradigm. Science Policy Research Unit University of Sussex.

Hashem, I. A. T., Yaqoob, I., Anuar, N. B., Mokhtar, S., Gani, A., & Ullah Khan, S. (2015). The rise of “big data” on cloud computing: Review and open research issues. Information Systems, 47, 98–115.

Herdt, R. W. (2010). Thoughts on Assessing the Impact of Improved Agricultural Technology on Poverty.

Instat. (2022). http://www.instat.gov.al/

Instat. (2023). http://www.instat.gov.al/

Islam, Md. M., Sarker, Md. A., Al Mamun, Md. A., Mamun-ur-Rashid, Md., & Roy, D. (2021). Stepping Up versus Stepping Out: On the outcomes and drivers of two alternative climate change adaptation strategies of smallholders. World Development, 148, 105671.

Jain, R, Arora, A, & Raju, S. S. (2009). A novel adoption index of selected agricultural technologies: Linkages with infrastructure and productivity. Agricultural Economics Research Review, 22(1), 109–120.

Lanjouw, J. O., & Lanjouw, P. (2001). The rural non-farm sector: Issues and evidence from developing countries. Agricultural Economics, 26(1), 1–23.

Lehmann, R. J., Reiche, R., & Schiefer, G. (2012). Future internet and the agri-food sector: State-of-the-art in literature and research. Computers and Electronics in Agriculture, 89, 158–174.

Maddux, J. E., & Rogers, R. W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. Journal of Experimental Social Psychology, 19(5), 469–479.

Michael E. Porter & James E. Heppelmann. (2014). How smart, connected products are transforming competition. 92(11), 64–88.

Mosher, W. D., Williams, L. B., & Johnson, D. P. (1992). Religion and fertility in the United States: New patterns. Demography, 29(2), 199–214.

Otsuka, K. (2000). Role of agricultural research in poverty reduction: Lessons from the Asian experience. Food Policy, 25(4), 447–462.

Poppe, K., Wolfert, J., Verdouw, C, & Renwick, A. (2015). A European perspective on the economics of big data. Farm Policy Journal, 12(1), 11–19.

Rogers, E. M., Takegami, S., & Yin, J. (2001). Lessons learned about technology transfer. Technovation, 21(4), 253–261.

Roy, M. & Doss, L. K. (2007). Building migratory bridges.

Runquist, W. N & Crook, E. (1984). Context effects in short-term memory: A complication. Bulletin of the Psychonomic Society, 22(6), 501–502.

Shoemaker, T. L. (1997). Factors affecting the implementation of internet use in Michigan K-12 schools. Wayne State University.

Sonka, M, Hlavac, V, & Boyle, R. (2014). Image processing, analysis, and machine vision.

Tong, S. Y. C., Davis, J. S., Eichenberger, E., Holland, T. L., & Fowler, V. G. (2015). Staphylococcus aureus Infections: Epidemiology, Pathophysiology, Clinical Manifestations, and Management. Clinical Microbiology Reviews, 28(3), 603–661.

Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M.-J. (2017). Big Data in Smart Farming – A review. Agricultural Systems, 153, 69–80.

Volume XIX, Issue (1) (2023) 562-576

International May Conference on Strategic Management

THE ROLE OF IT&C TO IMPROVE KM STRATEGIES FOR INNOVATION DYNAMICS WITHIN BUSINESS NETWORKS OF MNCS: AMERICAN MNCS VS EUROPEAN MNCS VS ASIAN MNCS

Chifan Denisa Alexandra[1,2*], Ipsalat Ionela-Beatrice[1]

[1]Stefan cel Mare University of Suceava, Romania; [2]University of Beira Interior, Portugal

Abstract: Innovation is now an important driver of economic expansion and competitiveness in global corporate networks. Multinationals, which play a significant role in the globalization process, create integrated technology networks and engage in innovative activities while benefiting from geographically dispersed R&D. In today's changing business climate, innovation has become the foundation of any corporation. The nature of global economic growth has changed as a result of the speed of innovation made possible by the constant evolution of technology. Both the availability of knowledge and the complexity resulting from increasing wealth play a significant role in innovation. MNCs use special knowledge management strategies in technology diffusion. The aim of this article is to enhance the knowledge of the role played by the IT&C sector in the US, European and Asian MNCs in consolidating KM strategies for innovation dynamics. This study combines a review of the literature on KM and innovation dynamics and a comparison of statistical data on innovation indicators for US MNCs vs European MNCs vs. Asian MNCs. The study's main contribution is a broad framework of US, European and Asian MNCs' use of IT&C to improve KM strategies for innovation dynamics in their particular business networks.

Keywords: MNCs, Innovation, IT&C, KM Strategies, Business Networks

1. INTRODUCTION

Knowledge Management (KM) and Information Technology and Communication (IT&C) are critical components for firms aiming to innovate and compete in a globalized economy. The purpose of this literature review is to examine and compare the use of IT&C in developing KM strategies for innovation dynamics inside business networks of multinational corporations (MNCs) in the United States (US), Europe, and some countries from Asia. The review examines studies from the recent decade, including academic journal articles, research reports, and conference proceedings.

Effective KM strategies are vital for encouraging innovation in MNCs, and effective KM requires an encouraging environment of sharing information and training. The study also emphasizes the significance of a global knowledge strategy that helps MNCs manage knowledge and information across their subsidiaries while using external knowledge sources. MNCs are more likely to have a KM system in place, leading to higher innovation

[*] *Corresponding author: chifan.denisa@yahoo.com*

performance levels than domestic firms. An open and innovative organizational culture is crucial for KM to effectively support innovation in MNCs most common research themes in the literature on KM and innovation in MNCs highlighted the importance of factors such as knowledge sharing, knowledge integration, and absorptive capacity effective KM practices play a critical role in enabling MNCs to innovate and compete in the global marketplace (Nonaka, 1995).

In today's hyper-connected and highly competitive corporate environment, the role of knowledge management (KM) in generating innovation and retaining a competitive advantage has become increasingly important. Because of the tremendous improvements in information technology and communication (IT&C), companies today have unprecedented access to data and knowledge that can be used to enhance their KM strategy (McKinsey & Company, 2018). This article will investigate the impact of IT&C on KM strategies for innovation dynamics within business networks of multinational corporations (MNCs), as well as how American MNCs' methods are different from those of European MNCs.

Knowledge Management is embedded into the main foundation/culture of an organization. The primary purpose of Knowledge Management is to ensure that the appropriate and correct information reaches the appropriate individual in an efficient manner. This can be applied in a variety of contexts, from an employee starting at a company on the first day of work and ensuring they have all the information they need to succeed, to a multinational company that is past its "growth" stage but continues to seek approaches of working together to innovate, to departments within the same company but in various business sectors and areas of expertise identifying methods to get information from one another (Yu Catherine, 2021).

The current trend in the strategies and practices of successful MNCs is to exploit the benefits of the Internet and other disruptive technologies by forming alliances, partnerships, and various forms of Business Networks with interested stakeholders (universities, research institutes, governments, international institutions, etc.) to jointly improve innovation, patenting and other forms of know-how that are specific to the knowledge society. A well-known author on the subject, namely Chesbrough, believes that "open innovation" has now become the best opportunity for companies to profit from technologies, especially digital technologies and/or other disruptive technologies (Chesbrough, 2003). Various examples of well-known companies cited as arguments in favor of open innovation (Xerox, IBM, Intel, AT&T, etc.) show that there is a clear trend towards "open innovation" in the American corporate world (Chesbrough, 2003). What are the realities and prospects for European and Asian corporations in exploiting the advantages of IT&C and the trend towards open innovation and/or the establishment of Business Networks for joint innovation? This study only provides some answers/clarifications to the above question as the subject is extremely complex in terms of international literature and practices encountered in the corporate world of the three poles of the economic triad (Europe, America, Asia). Therefore we will selectively highlight, as appropriate, only the more known realities and trends that have occurred in the strategies of American, European, and Asian corporations regarding their openness to "joint innovation" and/or "innovation with external partners" (Lindegaard, 2010).

However, the approaches of American MNCs and European MNCs to IT&C and KM strategies differ significantly. American companies tend to emphasize technology adoption and innovation more, while European companies focus more on collaboration and knowledge sharing within their business networks. At the same time, as we will discuss later, Japanese or South Korean companies seem to be fundamentally changing their strategies regarding joint innovation and the exploitation of patents obtained at least in certain industries such as automotive-electric or other high-tech sectors. This recent trend in the case of Japanese

Keiretsu and South Korean Chaebols groups can only partly be explained by the rapid rise of Chinese MNCs such as Huawei or Lenovo on the international scale. Those differences in approach have led to varying levels of success in leveraging IT&C for KM and innovation. These differences in approach have led to varying levels of success in leveraging IT&C for KM and innovation (Voigt et al., 2006). To better understand the differences in approach between American and European MNCs, this article will examine the key IT&C tools and strategies used by each region, as well as the challenges they face in implementing these tools effectively. By analyzing the approaches of all three regions, we can gain valuable insights into the best practices for using IT&C to improve KM strategies for MNCs and drive innovation.

2. LITERATURE REVIEW

In the knowledge economy, intangible assets, such as knowledge and information management, become the new essential tool for a company in order to acquire core competencies. We are in a world where we are dealing with "cognitive domains", where ideas are worth billions, while products cost less. The present and future society is based on knowledge. Knowledge production is the most important value-creating activity, not only for large knowledge-based firms but also for society in general (Drucker, 2001). Today knowledge is assumed to be the key asset, the effective exploitation of which determines success for the firm (Hadad, 2017).

Innovation is the essence of growth in a knowledge-based economy. Inherent in the concept of innovations is the recombination and re-assessment of existing knowledge as well as the creation of new knowledge (Mattes, 2010). A well-established argument for the existence of MNCs in the international management literature comes from these firms' abilities to transfer and exploit knowledge more efficiently through internal expansion than through external market mechanisms (Berry, 2014). The ability of multinational corporations (MNCs) to leverage their innovation competencies across globally dispersed subsidiaries is an increasingly valuable source of competitive advantage. Competition in many industries has become more knowledge and technology-intensive as firms strive to increase their global innovation capabilities. Innovative capability refers to the absorptive capacity of firms as gauged by their ability to accumulate and exploit new knowledge, leading to new and improved innovations that enhance their chances for growth and survival.

Drucker argues that most innovative business ideas come from methodically analyzing seven areas of opportunity, some of which lie within particular companies or industries and some of which lie in broader social or demographic trends. Astute managers will ensure that their organizations maintain a clear focus on all seven. But the analysis will take you only so far. Once you've identified an attractive opportunity, you still need a leap of imagination to arrive at the right response–call it "functional inspiration" (Drucker, 2002). Specialists do not unanimously agree on the definition of information technologies; however, the most relevant of all consists of understanding the collections of technological fields, which develop simultaneously and interdependently. Among the most important fields, we mention: computer science, electronics, and communications. In other words, there are two basic technological fields that rely on information and communication technologies as computer science and communication (Tugui & Radu, 2007).

At a general level, a firm's operations may be dispersed across different types of productive activity (the diversification of technologies or products) or over geographical space (the internationalization of the same). However, spreading the product markets in which the firm is involved may be a matter of exploiting more effectively established competencies

while moving into new areas of technological development means creating new competence (Cantwell & Piscitello, 2002). The increasing appreciation of the role of multinational corporations (MNCs) in the generation of technology across national boundaries has been facilitated by the recent trend for MNCs to establish internal and external networks for innovation. The development of cross-border corporate integration and intra-border inter-company sectoral integration makes it increasingly important to examine where and how innovative activity by MNCs is internationally dispersed and regionally concentrated. IT&C can facilitate the implementation of KM strategies for innovation dynamics within MNCs' business networks. For instance, IT&C can be used to create a knowledge-sharing culture that encourages employees to exchange knowledge and expertise, both within the organization and between different MNCs (Fosso Wamba et al., 2015). IT&C can also enable real-time communication, collaboration, and data sharing, which are essential for innovation. Research has shown that IT&C can improve KM strategies in MNCs and lead to greater innovation performance (Zhang et al., 2021).

The literature suggests that American MNCs are more advanced in their use of IT&C for KM and innovation than European MNCs as well as Asian MNCs. A study by Wang and Huang (2018) (Wang et al., 2020) found that American MNCs are more likely to adopt advanced IT&C technologies, such as cloud computing, big data analytics, and social media, for KM and innovation. Additionally, American MNCs tend to have a more open and collaborative culture, which supports innovation and knowledge sharing. In contrast, European MNCs are often more hierarchical and less willing to share knowledge across different business units or even between different countries (Salazar et al., 2017). Moreover, there is a lack of awareness of the importance of IT&C in KM strategies among European MNCs, which hinders their innovation performance (Alshawabkeh et al., 2020).

Businesses' ability for creativity and innovation is hindered by the unexpected rise of global economic competitiveness with challenging R&D challenges. This expansion necessitates precise judgment in order to invest more on the interrelated parts of knowledge, innovation, and technology management capability (Asim & Sorooshian, 2019).

3. KM AND DYNAMICS OF THE INNOVATION

Knowledge management (KM) is vital to the success of innovation because it enables businesses to gather, preserve, and distribute knowledge required for the development of new goods and services. Nevertheless, innovation is a dynamic process, and knowledge management is constantly changing. As a result, it is critical to investigate the dynamics of innovation and the role that KM plays in this process. Knowledge management has the potential to foster innovation by promoting the creation of knowledge, collaboration, and implementation. The research also emphasizes the relevance of social capital in KM, since it allows knowledge to be transferred between individuals and subsidiaries within a MNC (Obeidat et al., 2016).

The path of innovation inside MNCs is closely associated not just with a firm's present resources, but also with the future services that they may deliver. The major focus has been on information technology systems as effective means for initiating these improvements. True productivity gains are frequently the result of new technologies that improve or facilitate knowledge generation and management. While IT&Cs sector competence is certainly important in establishing a powerful competitive edge, IT alone does not account for the broader context of knowledge and its position in social relationships. Human action is required to generate and spread knowledge. As a result, while KM projects should include IT&C systems and technology concepts, they should also be supplemented by human

initiative (Johnston & Paladino, 2007). MNCs that rival with each other in terms of time - either in terms of innovation, speed-to-market, or response to climate changes - strive to be industry-defining organizations. To allow quick adaptability to dynamic developments in the business environment, this kind of situation necessitates flexible connection between organizational and knowledge structures (Nielsen et al., 2017).

4. OPEN INNOVATION OR INNOVATION BUSINESS NETWORKS

In the age of revolution, the future is not an echo of the past. In this era of progress, a world of industrial giants has been created, e.g. Mitsubishi, ABB, Citigroup, General Electric, Ford, DuPont, etc. Characteristics of companies of this type are rigorous planning, continuous improvement, static process control, the six sigma approach (a static concept that measures a process in terms of defects), re-engineering, and enterprise resource planning. An important aspect characteristic of top organizations is the element of innovation. Radical innovation is the kind of innovation that has the ability to change customer expectations, change the economics of the industry and at the same time redefine the fundamentals of competitive advantage (Hamel, 2010).

Drucker describes innovation as the main source by which the company can prosper, grow and maintain high profitability. Open innovation, on the other hand, was first proposed by Chesbrough and quickly aroused the interest of the business world. It defines open innovation as "a paradigm that assumes that companies can and should use both external and internal ideas as well as internal and external routes to market as companies seek to advance their technology" (Elmquist et al., 2009).

Open innovation was originally a focus of academic research but is now also in the public policy arena. In open innovation, companies must and can use external and internal ideas, as well as internal and external routes to market over time as they seek to advance their innovations (Bogers et al., 2018). Henry Chesbrough says that open innovation means that valuable ideas can come from both inside and outside the company and can reach the market from inside or outside the company. It expands the role of internal researchers to include not just knowledge generation, but also knowledge brokering. Open Innovations companies needed to combine internal research with external ideas and then needed to deploy ideas both within their own business and also through other companies' businesses (Chesbrough, 2003).

Open innovation is also defined as an innovation process that involves knowledge flows that are managed, according to the business model, intentionally across organizational boundaries (West & Bogers, 2017).

The form of open innovation differs from business to business, it is about connecting all internal and external resources properly throughout the innovation process in order to cope with possible innovations. Differences between forms of open innovation is given by the involvement of business partners, customers, and suppliers. Open innovation refers to the integration of external stakeholders in the whole innovation process (Lindegaard, 2010). Open innovation is pushing firms to reassess their leadership positions, which reflect the performance outcomes of their business strategies (Chesbrough & Appleyard, 2007).

This paradigm is used to analyse how organizations increase their innovation efforts by using inbound and outbound knowledge flows to improve the success of these efforts (West & Bogers, 2017).

Implementing open innovation produces significant benefits for both business and society (Docherty, 2006):

- ✓ the possibility of exploiting R&D processes being funded by partners;
- ✓ extension of the field of activity;

- ✓ opportunity to refocus some internal resources on finding, screening, and managing implementation;
- ✓ improved payback on internal R&D through sale or license of otherwise unused intellectual property;
- ✓ implementing internal groups to rush certain actions because the idea or opportunity can be "stolen";
- ✓ the possibility to carry out strategic experiments at low cost;
- ✓ the possibility to create an innovative organization, with continuous exposure and relationships with external innovators.

5. AMERICAN MNCS VS EUROPEAN MNCS VS OTHER MNCS

There is a growing body of literature that examines differences in innovation indicators between American multinational corporations (MNCs) and European MNCs.

American multinational corporations (MNCs) tend to invest more in research and development (R&D) than European MNCs. According to a European Commission analysis, American MNCs accounted for more than two-thirds of worldwide R&D investment in 2016, while European MNCs accounted for little more than one-quarter (European Commission, 2018).

American multinationals create more patents than European multinational companies. According to a survey conducted by the European Patent agency, American firms accounted for 42% of all patent applications submitted with the agency in 2019, compared to only 24% for European firms (European Patent Office, 2019).

There is some evidence that American MNCs outperform European MNCs in terms of innovation. MNCs were more likely than domestic enterprises to have a formal knowledge management system in place, and knowledge management practices affected both MNC and domestic firm innovation performance. However, American MNCs outperformed European MNCs in terms of the impact of knowledge management practices on innovation performance (Bowman et al., 2016).

European MNCs tend to be more open to collaborating with external partners and utilizing external knowledge sources than American MNCs. European companies are more likely to engage in open innovation practices such as partnering with external organizations and crowdsourcing ideas than American companies (Chesbrough & Brunswicker, 2014).

American MNCs are generally seen as more advanced in their digitalization efforts than European MNCs. For example, a study by the McKinsey Global Institute found that the United States was leading the way in digitalization across a range of industries, while European countries lagged behind (Manyika et al., 2016).

Overall, while American MNCs may have some advantages in terms of R&D investment, patent generation, and innovation performance, European MNCs may be more open to external collaboration and utilize external knowledge sources more effectively. Additionally, American MNCs are generally seen as more advanced in their digitalization efforts, which could give them an advantage in the future.

In Table 1, we present a selection of the 50 companies considered to be the most innovative globally, from 2005 to the present, according to studies conducted by BCG, WIPO, McKinsey, Fortune, European Commission reports, etc. Synthesis in the following table shows by default the distribution of the 50 companies on the three poles of global power. The data presented in the following table requires some preliminary clarifications, in particular:

- ✓ First of all, it is necessary to bring together a number of sources of studies/evaluations and sources of statistical data that are carried out from different perspectives of analysis;
- ✓ For the consistency of the data in the table we proceeded to an empirical and approximate evaluation of the funds allocated to R&D as well as the annual number of patents obtained by a company (determined by the authors as a simple average for the last 3 years (2019, 2020, 2021, etc.).

Table 1. The ranking of the most innovative 50 companies in 2022 in the US, Europe, and Asia. Implications for technological supremacy at Global Level.

USA			
MNC * maintaining the position/number in the BCG ranking	R&D (annual funds, turnover percent (%), Absolute value (billion USD)	Annual granted patents,, average approx.	Company position and implications for international competition on technological advancement
1. Apple	6-7%, $16-24	2000-2500	In 2018 it was the first company in the world to surpass $1 trillion in market capitalization; it remains among the most innovative U.S. companies as well as globally
2. Microsoft	12-15%, $11-13	3000-4000	It remains one of the world's leading software manufacturers.
3.IBM	5-6%, $5-6	9000-9300	It remains one of America's most innovative companies for decades to come.
EUROPA			
20. Siemens	6-9%, $5-6	2500-3000	Major manufacturer in several high-tech sectors; invested in the microchip industry.
47. Philips	13-14%, $4-5	2200-2500	Major European manufacturer of computers, laptops, etc.
50. Unilever	2-3%, $1-2	200-250	One of the bigger consumer goods companies achieves a smaller number of patents.
ASIA			
6. Samsung	8-10%, $16-20	6000-7000	The most important South Korean company, has become a rival to Apple, Intel etc..
8. Huawei	15-16%, $18-20	3000-4500	Innovative Chinese company in 5G industry, mobile phones etc.
21. Toyota	3-7%, $10-11	3200-3300	Japan's leading manufacturer in the automotive industry; remains extremely innovative; develops EV
39. Hitachi	5-6%, $4-5	5700-6300	It remains one of Japan's innovative companies in electronics and related sectors.

*** Companies in this category do not disclose in their Annual Report the amount of funds allocated to R&D. By the nature of their business, they make fewer technical innovations each year, but can be considered innovative by the level of use of disruptive technologies.**

Source: Elaborated by the authors based on BCG, WIPO, McKinsey, Fortune, European Commission reports, Annual Reports 2019, 2020, 2021; integral comparative analysis is found in Annex 1

A close analysis of the ranking and associated indicators presented by us in Table 1 leads us to the conclusion that the vast majority of the companies considered by BCG to be the most innovative in the world over almost two decades are companies in the IT&C sector or that have at least a very strong link to digital and/or disruptive technologies. In this sense, we highlight the fact that the electric car industry has itself become a disruptive industry (it

will gradually take over the role of the traditional car) and that in this sector the most famous and important companies are still the American ones, namely Tesla and NIO. In this industry, companies such as Toyota, Volkswagen, and Renault are far behind American companies in the use of robots in the production of electric cars and in the level of integration of digital technologies inside a car body.

On the basis of the same data in Table 1, some important aspects can be highlighted that give a synthetic picture of the position of the US companies compared to European and Asian companies in the global IT&C sector.

The previous statement is supported by statistical arguments schematized in Figure 1 and 2 below.

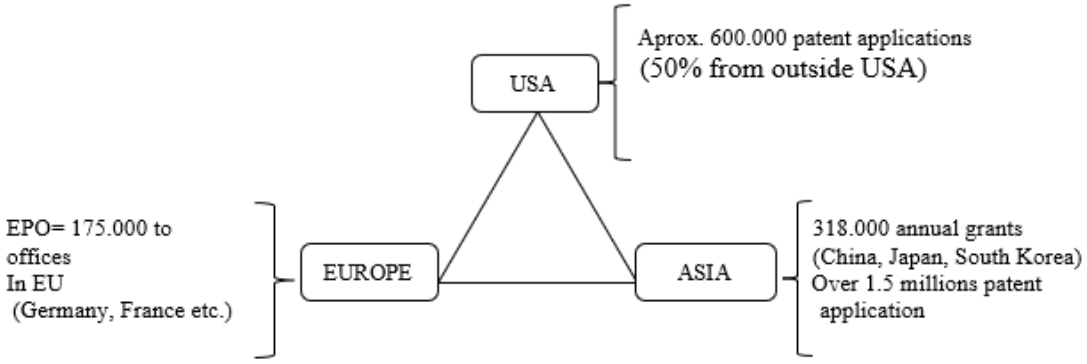


Figure 1. Patent application by global head offices
(Source: Elaborated by the authors based on WIPO, 2019)

The economic trends encountered between 2020 and 2022, cannot be considered in the perspective of an uusal business cycle. Rather, two historic external shocks occurred: a global pandemic that caused a prolonged global economic stagnation, and just before the recovery was, the conflict in Ukraine, which had significant global economic consequences. Nonetheless, key indicators of global science and innovation investments such as scientific publications, R&D expenditures, international patent filings, and venture capital deals continued to be resilient in 2020 and 2021. In 2021, international patent filings increased by 0.9 percent, reaching over 278 million, a new milestone (Global Innovation Index Report, 2022).

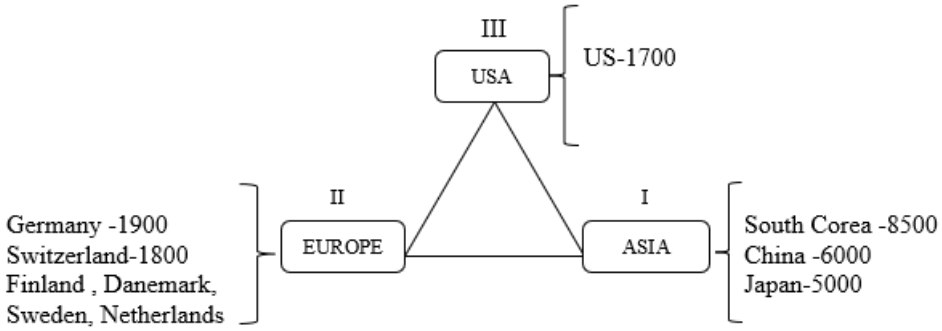


Figure 2. Patent application per unit of USD 100 billion GDP
(Source: Elaborated by the authors based on WIPO, 2019)

Variations in patenting activities among nations reflect disparities in their size and economic structure. Examining resident patent activity in relation to population, research and development investment, gross domestic product (GDP), and other factors is highly valuable. The highest number of patent applications was filled by Asian companies, mainly Republic of Korea, China and Japan.

The comparative analysis presented by us in this section of the study needs some clarifications, implicitly highlighting some trends regarding patenting and continuous innovation in the IT&C sector of the global economy, because if one evaluates too briefly the statistical data on patent application by major countries of the world and/or the statistical data on the efficiency of funds per GDP and population, one could conclude that Chinese MNCs have already reached a dominant position in this high tech sector of the global economy, which is not true. In order to argue this last point, we summarize below some historical aspects and some trends for the next two decades in global strategic thinking and corporate practices:

a. First of all, we recall that, from a historical perspective, in the 1980s and 1990s, Japanese companies began to obtain an increasing number of patents annually, including under the aegis of the USPTO, seeming to succeed in overtaking the supremacy of American companies in terms of innovation and technological advance (demographically, the US represented more than double the population and number of firms compared to Japan, both in the 1980s and today). As we know, there has never been a reality check on innovation and patenting between Japanese vs. US firms in terms of innovative capacity and technology ownership in either the high-tech or medium-tech sectors of the global economy. The statistical trend recorded in the 1990s about the number of patents obtained by Japanese firms was because during that period Japanese companies were in a long process of catching up with the US in terms of technology, which required them to take over technologies and develop their own innovative capabilities.
b. The recent situation between China vs US vs Europe regarding the number of patent applications (China has 1.8 million applications, out of a total of 3.5 million applications globally, by 2021, according to WIPO) can be explained by the fact that tens of millions of Chinese MNCs or SMEs find themselves technologically outpaced by their American or European competitors, and are in the process of catching up with the technological gap, which requires their own patents and the assimilation of known technologies (in fact, out of a total of 1.8 million patent applications of Chinese companies, the vast majority of them, i.e. more than 95-98%, are to the Chinese patent office, which means that their international relevance is minimal and that they only refer to the assimilation of already known technologies).
c. Since 2015, there have been major changes in the strategy for obtaining and exploiting joint patents (essentially business networks, and various partnerships that are directly/indirectly specific to the concept of open innovation) in the electric car industry. This is because Toyota has officially decided that from 2015-2016, about 23,000 patents - which relate only to technologies and components for EVs and other vehicles using solar energy, etc. - will be assigned to other companies, including competitors, without any annual license fees. Subsequently, Tesla, starting in 2020, has adopted a similar strategy with regard to its entire EV patent business; what prospects are there for obtaining and exiting patents in other industries.

6. CONCLUSIONS

In conclusion, IT&C plays a critical role in improving KM strategies for innovation dynamics within MNCs' business networks. American MNCs are more advanced in their use of IT&C for KM and innovation than European MNCs. However, European MNCs can learn from American MNCs by adopting more advanced IT&C technologies and fostering a more open and collaborative culture to support innovation and knowledge sharing. By doing so, European MNCs can improve their innovation performance and remain competitive in a globalized economy.

The success of an organisation is determined by the quality of management in that organisation. Whether we are talking about American, European or Asian multinationals, without a real and transparent approach, without implementing methods that help the company, it cannot achieve its fourth position and competitiveness in the market.

In the systematic review above we have presented analytically aspects of knowledge management, open innovation, the role of MNCs and the importance of IT&C.

In conclusion, IT&C plays a critical role in improving KM strategies for innovation dynamics within MNCs' business networks. American MNCs are more advanced in their use of IT&C for KM and innovation than European MNCs. However, European MNCs can learn from American MNCs by adopting more advanced IT&C technologies and fostering a more open and collaborative culture to support innovation and knowledge sharing. By doing so, European MNCs can improve their innovation performance and remain competitive in a globalized economy.

As we pointed out in our analysis open innovations can be successful in an MNC if firms can recognise what approaches work for their company. We believe that open innovation helps MNCs to expand beyond their own boundaries, which closed innovation cannot do because it relies only on internal resources. This is not really beneficial for MNCs in today's market conditions, globalisation and competition between companies.

Regarding the general theoretical aspects, according to the authors in the field of economics, the data presented provided evidence supporting the idea that innovation is a growth engine of a company, according to the dynamic business environment innovation is the foundation of any top company.

According to our analysis it can be seen that American MNCs have a higher share of KM and are also mostly at the top of the rankings analyzed by us. Although this is evident from the analysis, it does not mean that the rest of the MNCs do not represent a "threat" in the market. Competition from MNCs globally is accentuated by the fact that MNCs want to have a total market share.

REFERENCES

Alshawabkeh, R., Abu Rumman, A., Al-Abbadi, L., & Abu-Rumman, A. (2020). The intervening role of ambidexterity in the knowledge management project success connection. Problems and Perspectives in Management 18(3), 56–66.

Asim, Z., & Sorooshian S. (2019). Exploring the Role of Knowledge, Innovation and Technology Management (KNIT) Capabilities that Influence Research and Development. Journal of Open Innovation: Technology, Market, and Complexity, 5(2), 21.

Berry, H. (2014). Global Integration and Innovations: Multicountry Knowledge Generation Within MNCs. Strategic Management Journal, 35(6), 869-890.

Bogers, M., Chesbrought, H., & Moedas, C. (2018). Open Innovation: Research, Practice and Polices. California Management Review, 60(2), 5-16.

Bowman, H., Molina-Castillo. F. J., & de Reuver, M. (2016). Business Model Innovation in European SMEs: some preliminary findings. BLED 2016, Proceedings, 9.

Cantwell, J., & Piscitello, L. (2002). The location of technological activities of MNCs in European regions: The role of spillovers and local competencies. Journal of International Management, 8(1), 69-96.

Chesbrough, H., & Brunswicker, S. (2014). A Fad or a Phenomenon?: The Adoption of Open Innovation Practices in Large Firms. Research Technology Management, 57(2).

Chesbrough, H. (2003). Open Innovations The New Imperative for Creating and Profiting from Technology. Harvard Business School Press.

Chesbrough, H., & Appleyard M. (2007). Open Innovation and Strategy. California Management Review, 50(1), 57–76.

Docherty, M. (2006). Primer on "open innovation": Principles and practice. PDMA Visions, 30(2).

Drucker, P. (2001). The essential Drucker. Translated in Romanian 2010 Mether Press, pp 260–261. Elsevier Ltd.

Drucker, P. (2002). The Discipline of Innovation. Harvard Business Review Press.

Elmquist, M., Fredberg, T., & Ollila, S. (2009). Exploring the field of open innovation. European Journal of Innovation Management, 12(3).

Fosso Wamba, S., Akter, S., Edwards, A., Chopin, G., & Gnanzou, D. (2015). How 'big data' can make big impact: findings from a systematic review and a longitudinal case study. International Journal of Production Economics, 165, 234-246.

Hadad S. (2017). Knowledge Economy: Characteristics Dimensions, Management Dynamics in the Knowledge Economy Journal.

Hamel, G. (2010). How to thrive in turbulent times by making innovation a way of life. At the forefront of the revolution. Editura Publica. (in Romanian).

Johnston, S., & Paladino, A. (2007). Knowledge management and involvement in innovations in MNC subsidiaries. Management International Review, 47(2), 281–302.

Lindegaard, S. (2010). The Open Innovations Revolution – Essentials, Roadblocks and Leadership Skills. Publisher by John Wiley&Sons.

Manyika, J., Lund, S., Bughin, J., Woetzel, J., Stamenov, K., & Dhingra, D. (2016). Digital Globalization: The new era of global flows. McKinsey Global Institute.

Mattes J. (2010). Innovation in multinational Companies: Organisational, International and Regional Dilemmas. Publisher Peter Lang.

McKinsey & Company. (2018). The business value of knowledge management.

Nielsen, B. B., Asmussen, C. G., & Weatherall, C. D. (2017). The location choice of foreign direct investments: Empirical evidence and methodological challenges. Journal of World Business, 52(1), 62–82.

Nonaka, I. (1995). The knowledge-creating company: how Japanese companies create the dynamics of innovation. New York: Oxford University Press.

Obeidat, B. Y., Al-Suradi, M. M., Masa'deh, R., & Ali Tarhini, A. (2016). The impact of knowledge management on innovation. Management Research Review, 39(10), 1214–38.

Salazar, J. A., Herrero, Á., & Arcelus, F. J. (2017). Knowledge management and innovation in European manufacturing firms. Journal of Knowledge Management, 21(5), 1165–84.

Tugui, A., & Radu, L. D. (2007). Could we speak of a fifth wave of IT&C? International Conferince on E-ACTIVITIES, Spain.

Voigt, K.I., & Andreas Homburg, A. (2006). The influence of information technology on knowledge management: a comparative study of American and German companies". Journal of Strategic Information Systems 15, nr. 2.

Wang, K., Wang, J., Mei, S., & Xiong, S. (2020). How Does Technology Import and Export Affect the Innovative Performance of Firms? From the Perspective of Emerging Markets Firms ediție de M. Eisencraft. Complexity, 3810574.

West, J., & Bogers, M. (2017). Open innovation: current status and research opportunities. Innovations: Organization & Management, 19(1).

Yu, C. (2021). Knowledge Management in Multinational Companies: Informative Case Studies and Their Applications to the Future. MIT Sloan School of Management.

Zhang, Y., Liu, S., & Wei, Y. (2021). The impact of social media use on knowledge sharing and innovation performance.

Annex 1**.** The ranking of the most innovative 50 companies in 2022 in the US, Europe, and Asia. Implications for technological supremacy at Global Level.

USA			
MNC * maintaining the position/number in the BCG ranking	R&D (annual funds, turnover percent (%), Absolute value (billion USD)	Annual granted patents,, average approx.	Company position and implications for international competition through technological advancement
1. Apple	6-7%, $16-24	2000-2500	In 2018 it was the first company in the world to surpass $1 trillion in market capitalization; it remains among the most innovative U.S. companies as well as globally
2. Microsoft	12-15%, $11-13	3000-4000	It remains one of the world's leading software manufacturers.
3. Amazon	11-13%, $11-13	3000-4500	Leader in the online sales industry; highly innovative
4. Alphabet	13-16%, $26-32	3000-3500	Global technology company, Extremely innovative
5. Tesla	4-6%, $1-2	2000	Leading manufacturer in the EV industry, Extremely innovative
7. Moderna	20%, $0.5-3	10-25	Important manufacturer in the pharmaceutical industry
10. IBM	5-6%, $5-6	9000-9300	It remains one of America's most innovative companies for decades to come.
11.Meta	19-21%, $13-25	900-1200	It is regarded as one of the Big Five American information technology companies
12. Nike	3%, $1-2	2000-3000	One of the leading manufacturers in the sporting goods industry; extremely innovative
13. Walmart	*	60-80	The biggest player in the retailing industry; it has over 2 million employees; it is particularly involved in social innovations (in the low-tech

			sector, technical innovations are not specific).
14. Dell	5-6%, $1-2	2000-2500	Remains one of the leading manufacturers in the computer, laptop etc. industry; highly innovative
15. Nvidia	18-24%, $3-5	2500-3000	Along with Intel and others, it remains one of the leading manufacturers in the semiconductor (chips) industry. Only a few manufacturers have the technological edge to produce the latest generations of chips.
17. Target	*	70-100	Target Corporation is the fifth largest U.S. retailer by sales, behind Wal-Mart, Home Depot, Kroger and Costco.
18. Pfizer	13-24%, $8-11	1000-1200	Important manufacturer in the pharmaceutical industry
19. Oracle	15-17%, $6-8	3000-3300	Major manufacturer in the software industry; extremely innovative technically
23. HP	2-3%, $1-2	2000-2300	Major manufacturer in the computer equipment industry
27. Johnson&Johnson	14-16%, $12-13	4000-4500	Major manufacturer in the pharmaceutical industry; one of the most innovative on the latest generations of medicine.
28. Cisco	11-13%, $6-7	1300-1500	Cisco delivers innovative security, cloud and software-defined networking solutions to help businesses.
29. GE	4-5%, $4-5	2000-2400	Major manufacturer in the household appliances, electronics etc industry; extremely innovative.
32. Ebay	12-15%, $1-2	250-300	Important provider in online sales; extremely innovative
34. Procter&Gamble	3-4%, $2-3	700-800	Important manufacturer in the chemical industry, cosmetics, etc.
36. Coca Cola	*	50-55	The largest manufacturer in the soft drinks industry; it mainly achieves social innovations.
37. 3M	5-6%, $2	3300-3600	Major manufacturer in several high-tech industries; produces a very large number of patents.
38. Pepsi&Co	1-2%, $0-1	300-400	Competitor for CocaCola; social innovations.
42. GM	5-7%, $7-8	700-900	Important manufacturer in the automotive industry; extremely innovative
43. Ford	4-6%, $6-8	3200-3300	Important manufacturer in the automotive industry, extremely innovative.

44. Intel	17-20%, $13-14	2500-3000	Leading manufacturer of next generation semiconductors
EUROPA			
20. Siemens	6-9%, $5-6	2500-3000	Major manufacturer in several high-tech sectors; invested in the microchip industry.
25. Zalando	*	10-15	operates in the online sales industry; social innovations.
26. Bosch	8-9%, $6-7	2800-3000	Major manufacturer in several medium-tech sectors; recently started investing in ITC.
35. Adidas	4-5%, $0-1	1000-1300	Competitor for Nike; extremely innovative
40. SAP	14-15%, $4-5	1000-1300	Activates in the business of making software for other companies and organisations.
47. Philips	13-14%, $4-5	2200-2500	Major European manufacturer of computers, laptops, etc.
49. Nestle	1-3%, $1-3	1900-2200	Leading manufacturer in the food industry, technical innovations
50. Unilever	2-3%, $1-2	200-250	One of the bigger consumer goods companies, achieves a smaller number of patents.
ASIA			
6. Samsung	8-10%, $16-20	6000-7000	The most important South Korean company, a rival to Apple, Intel etc.
8. Huawei	15-16%, $18-20	3000-4500	Innovative Chinese company in 5G industry, mobile phones etc.
9. Sony	7-8%, $5-6	3000-3500	Remains a leading Japanese manufacturer in the IT industry; also started production in the EV industry.
16.LG	9-10%, $5-6	2800-3500	Major South Korean manufacturer in the IT industry, competitor for Samsung.
21. Toyota	3-7%, $10-11	3200-3300	Japan's leading automaker; remains extremely innovative; develops EV
22. Alibaba	8-10%, $5-6	1000-2500	The largest Chinese company in online sales; it has become a direct competitor to Amazon.
24. Lenovo	4-5%, $2-3	2000-2500	Leading global PC manufacturer; Chinese company with rapid internationalization strategy; acquired IMB's PC division.
30. Jingdong	*	30-50	JD.com is the largest retailer in China, a member of the NASDAQ100 and a Fortune Global 500 company.

31. Xiaomi	5-6%, $2-4	2600-3500	Chinese manufacturer recently entered the international telecommunications market; a fast-emerging leading manufacturer of cheaper mobile phones; extremely innovative.
33. Hyundai	4-6%, $4-6	200-300	Major South Korean manufacturer in the automotive and related industries.
39. Hitachi	5-6%, $4-5	5700-6300	It remains one of Japan's innovative companies in electronics and related sectors.
41. Tencent	9-11%, $5-9	4800-5500	Tencent is a world-leading internet and technology company that develops innovative products and services to improve the quality of life of people around the world.
45. Bytedance	*	*	Bytedance Ltd is a Chinese internet technology company headquartered in Beijing and incorporated in the Cayman Islands
46. Panasonic	6-7%, $4-6	2800-3000	Important Japanese company; remains extremely innovative.
48. Mitsubishi	4%, $1-2	2100-2300	Japanese automotive manufacturer in an alliance with Nissan and Renault

*Companies in this category do not communicate in the Annual Report the number of funds allocated to R&D. By the nature of their activity, they carry out fewer technical innovations per year but can be considered innovative by the level of use of disruptive technologies.

Source: Elaborated by the authors based on BCG, WIPO, McKinsey, Fortune, European Commission reports, Annual Reports 2019, 2020, 2021

Volume XIX, Issue (1) (2023) 577-586

International May Conference on Strategic Management

COMPARISON OF STUDENTS' ATTITUDES ABOUT THE FAMILY BUSINESS – 10 YEARS IN BETWEEN

Aleksandra Radić*, Ivica Nikolić

University of Belgrade, Technical Faculty in Bor, Serbia

Abstract: Family entrepreneurship is considered to be one of the oldest and most widespread forms of organizational and economic endeavors. A family business has multiple advantages and contributes significantly to the overall economy of a country. That is why entrepreneurial education has a great impact on creating new entrepreneurial potentials. This paper presents an examination of the attitudes of the student population of the Technical Faculty in Bor towards the family business in the three year period, namely in 2012, 2022 and 2023. The questions are grouped into five groups of motives for initiating one's own business or continuing a family business: (1) Locus of control, (2) Entrepreneurial self-efficacy, (3) Independence motive, (4) Innovative motive and (5) Motivation to develop own business. The results show that in the three observed periods Independence motives and Innovation motives had similar average values, while the remaining three motives Locus of Control, Entrepreneurial Self-Efficacy and Growth Motivation had low average values in 2022 during the COVID-19 pandemic, while the values of these three motives increased in 2023.

Keywords: entrepreneurship, faculty, family business, students

1. INTRODUCTION

Entrepreneurship has been studied from different points of view since the end of the 20th century, whether from an economic or psychological point of view, and it has been particularly studied since the beginning of the 21st century (Perez-Perez et al., 2021; Rovelli et al., 2021; Valdez-Juárez & Pérez de Lema, 2023). Family entrepreneurship as one of the forms of entrepreneurship is considered one of the oldest forms of organization of activity and enterprise (Kayid et al., 2022). The importance of family entrepreneurship is reflected in the creation of new jobs and contribution to innovative activity (Mustapha & Selvaraju, 2015; Egerová et al., 2017; Mawardi & Sahputri, 2022) as well as in contributing to the GDP and solving the problem of youth unemployment (Chaudhary et al., 2021).

Merely obtaining a diploma after graduation is not a sufficient guarantee of employment (Edelmanet al., 2016). When looking for a job, young people often choose entrepreneurship, and it is not surprising that, according to a study (Lévesque & Minniti, 2011), young people between 25 and 34 years old most often decide to become entrepreneurs.

Numerous studies have confirmed that in family entrepreneurship, graduates often continue and develop the family business (Cieślik & Van Stel, 2017; Marques et al., 2018; Mawardi & Sahputri, 2022). Entrepreneurial education is an important influencing factor in this

* *Corresponding author: aradic@tfbor.bg.ac.rs*

regard. There is a growing body of work examining the impact of education on entrepreneurial intention (Sugianingrat et al., 2020; Djazilan & Darmawan, 2022).

When it comes to causation, interest increasingly shifts to students as family members who inherit the family business or someone who wants to start their own business inherited from the family. Accordingly, the purpose of this paper is to analyze the motives of students at the Technical Faculty in Bor for starting their own business or taking over a family business in three different time periods. The first part of the paper refers to the theoretical overview, while the second part of the paper is focused on the presentation and discussion of the research results.

2. LITERATURE REVIEW

The results of a study conducted at a Mexican university (Valdez-Juárez & Pérez de Lema, 2023) confirmed that creativity has a positive and statistically significant impact on students' self-efficacy and entrepreneurial intention. In the same study, the family business environment was shown to have positive and significant effects on self-efficacy. Personal orientation is also an important factor in the decision to undertake an entrepreneurial venture (Marques et al., 2018).

Gender plays an important role in the orientation of men and women toward entrepreneurship. According to a study (Marques et al., 2018), female students show greater proactivity towards entrepreneurship. This hypothesis is also supported by Dragin et al. (2022), who note that in the 20th century, gender analyzes showed a greater appreciation of male skills than female skills, which limited women's entrepreneurial efforts. This can be understood as a paradox, as women are naturally more prone to fantasy and idealization (Dragin et al, 2022). In contrast, a study conducted as part of the research on Malaysian students' entrepreneurial intentions shows that gender does not have a significant impact on their willingness to engage in entrepreneurial ventures (Mustapha & Selvaraju, 2015).

Apart from the fact that learning entrepreneurship is considered an important contribution to starting one's own business, entrepreneurial intention is also awakened in the family environment. Therefore, a strong entrepreneurial intention can be more easily achieved if a person comes from an entrepreneurial family, and this can have a great impact on having more experience in socialization, risk-taking, innovation, and proactivity (Marques et al., 2018). In their research, Cieślik and Van Stel (2017) confirmed the hypothesis that students who come from families with a family business have a significant advantage in terms of accumulating knowledge, experience, and capital when they inherit a family business compared to students who start their own business. Students with a family entrepreneurial background are more likely to make decisions about entrepreneurial ventures. Also, in a study of Indonesian students, it was confirmed that students who come from families with their own business are more likely to continue the family business or start their own business (Mawardi & Sahputri, 2022).

In a study by Egerová et al. (2017), it was found that self-efficacy is an important factor for entrepreneurial intention and that self-efficacy is higher in students who have entrepreneurship education. The results of a study on a sample of management students at a university in Jakarta show that self-efficacy has a positive effect on students' perceptions of entrepreneurship (Sandi & Nurhayati, 2020). In a study conducted by Mawardi and Sahputri (2022) on a sample of Indonesian students, it was shown that economic independence was the highest rated motive for starting a business. Innovation motive is also very important. Innovation means encouraging new ideas, novelty, experimentation, and creative processes (Dragin et al., 2022).

In Serbia, the study of student population attitudes toward family entrepreneurship is also very common. Jovin et al (2018) conducted a research in two vocational schools in Vojvodina.

In the same period, a similar study was conducted by Jovin and Jošanov Vrgović (2018) to investigate the entrepreneurial intentions of students from Vojvodina. The results of the mentioned study showed that students are willing to start their own business. In 2020, Marčetić and Muškilić conducted a study aimed at investigating the gender difference in young people's attitude towards entrepreneurship in Serbia. The survey was conducted among students in southern Serbia, mainly studying economics. This research showed that there is a gender difference among students in Southern Serbia in terms of intention to start their own business (Marčetić & Muškilić, 2020).

In 2018, the Centre for International Public Policy published the results of a survey of 1,200 students from 30 faculties at the University of Belgrade. Within this survey, several important conclusions were drawn, the most important of which are the following:

- students believe that university education is not enough to start a business,
- students believe that the labour market is not sufficiently aligned with the education system in Serbia.

This research also indicates that legal rules and regulations are a major barrier to starting a business (CMJP, 2018).

A 2015 study by Liebeck (Libertarian Club) concluded that the public sector often provides the illusion of long-term job security, while entrepreneurship is often seen as a risky endeavor. Lack of initial capital, complicated administrative procedures, high taxes, insufficient information, and inadequate formal education were cited as major barriers to starting a business. It was also pointed out that in contrast to global statistics, where most new businesses are started by young people with a college degree, in Serbia they are the least willing to focus on their own business (Libek, 2015).

It should be noted that in Serbia there is no adequate research that examines the relationship between the student population and family entrepreneurship, which opens a large space for conducting this type of research. Very few authors study student entrepreneurship in relation to family business, which opens great opportunities for research in this area.

3. ATTITUDES OF STUDENTS TOWARDS ENTREPRENEURSHIP

An important source of economic growth is the entrepreneurial society. The entrepreneurial society is a concept that, by investing in knowledge in the field of innovation and entrepreneurship, leads to the spread of this knowledge to all economic agents and not only to direct investors (Audretch, 2009). For these reasons, universities are the fundamental places for the creation of this type of knowledge and thus play an irreplaceable role in the creation of an entrepreneurial society. Appropriate educational services provided by universities can support and encourage young people from various professional fields to start new businesses, thus contributing to comprehensive economic growth, reducing unemployment and increasing national competitiveness (Vučković et al., 2021).

For decades, collaboration between universities and business has been seen as the most important way to create and implement innovation in business. Indeed, universities, often with the financial and infrastructural support of certain companies, have developed new products and/or processes that have then been further used or brought to market by said companies. The synergistic effect of such a partnership was created by combining the intellectual capacities of the universities with the technological and economic capacities of the companies. Although universities and scientific institutes remain an important source of new ideas, companies are increasingly turning to start-ups in search of innovations. For these reasons, student entrepreneurship is increasingly coming to the fore.

Student entrepreneurship refers to entrepreneurial ventures initiated by students (Bergmann et al., 2016). It offers several benefits, both to students and to the university. Some of the largest companies in the world were founded when their founders were students (Google, Facebook, Yahoo, Dropbox, etc.). Good family motivation for entrepreneurship and adequate knowledge at universities will contribute to the development of family businesses that will have a significant impact on the national economy and beyond.

Student entrepreneurship is recognized at universities around the world. Many universities organize entrepreneurship teaching programs and provide various types of support to encourage entrepreneurship and venture development among their students, whether it is a family business or other type of enterprise. In recent years, the world's leading universities, thanks to their approach to student entrepreneurship, have managed to train thousands of entrepreneurs whose businesses are now worth tens of billions of dollars. Table 1 provides an overview of the 30 universities whose entrepreneurship programs produced the most entrepreneurs between 2006 and 2020 (Pitchbook, 2020).

Table 1. List of higher education institutions by the number of students/graduates who became entrepreneurs in the period 2006 to 2020 (Pitchbook, 2020)

Rank	University	Founder count	Company count	Capital raised
1	Stanford University	1,448	1,258	$47.8B
2	University of California, Berkeley	1,365	1,225	$36.3B
3	Massachusetts Institute of Technology	1,125	985	$33.4B
4	Harvard University	1,100	988	$41.2B
5	University of Pennsylvania	1,021	932	$22.6B
6	Cornell University	888	924	$28.6B
7	University of Michigan	835	760	$19.1B
8	Tel Aviv University	807	673	$16.1B
9	University of Texas	749	686	$10.2B
10	University of Illinois	621	575	$16.4B
11	Yale University	616	560	$15.6B
12	Technion - Israel Institute of Technology	602	509	$12.4B
13	Princeton University	593	560	$19.5B
14	University of California, Los Angeles (UCLA)	588	554	$15.0B
15	Columbia University	546	510	$15.3B
16	Brown University	542	496	$20.6B
17	University of Wisconsin	539		$8.8B
18	University of Southern California (USC)	520	480	$17.8B
19	Carnegie Mellon University	506	447	$13.6B
20	Duke University	484	461	$11.0B
21	Brigham Young University	475	378	$8.2B
22	University of Waterloo	474	375	$12.9B
23	New York University	465	431	$9.2B
24	University of Washington	456	403	$8.4B
25	Dartmouth College	438	400	$11.3B

A common feature of the universities listed in Table 1 is that each has established some form of support for student entrepreneurship. These universities have business incubators, entrepreneurial capital funds, and a strong network of external partners that create a stimulating

entrepreneurial environment. In this regard, the teaching process must inevitably be enriched with entrepreneurial programs, practical assignments, and research from the very beginning of the program. Combining the teaching process focused on practical knowledge and innovation with the entrepreneurial infrastructure creates a synergy that simultaneously motivates students to consider entrepreneurship as their career path, but also facilitates and encourages the implementation of their entrepreneurial ideas.

The Global Entrepreneurship Index (GEI) is a measure of the quality and dynamism of entrepreneurship and explains the role entrepreneurship plays in economic development. The map in Figure 1 shows the overall GEI score for each of the 137 countries in the 2018 Global Entrepreneurship Index.

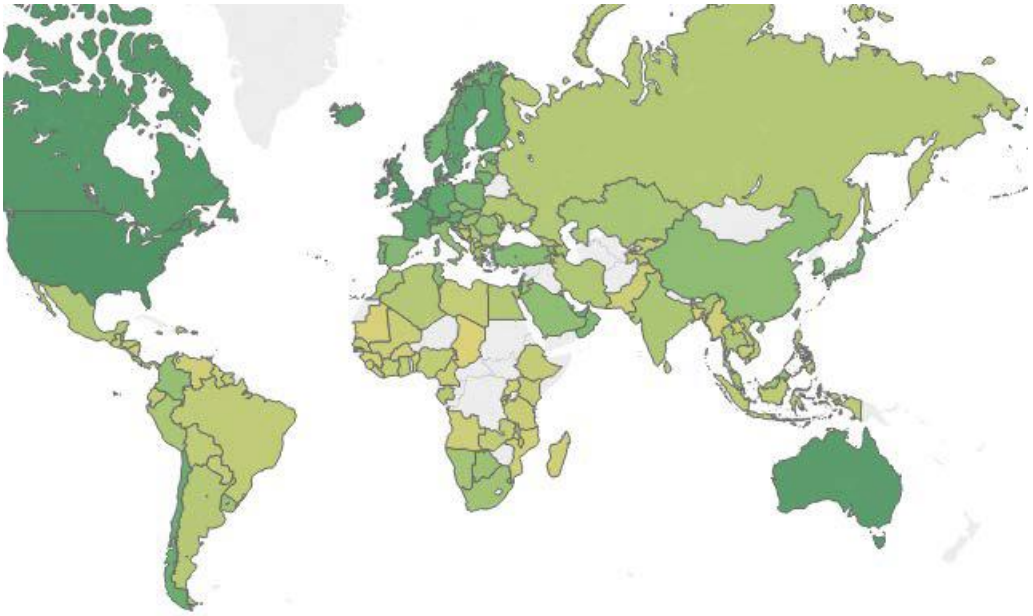


Figure 1**.** The overall GEI score for each of the 137 countries in the 2018 Global Entrepreneurship Index (GEDI, 2018).

Considering the role of the university in the development of student entrepreneurship, it is important to look at the results related to the entrepreneurship knowledge and skills sub-index. Both indicators point to the importance of education for entrepreneurship, which has a strong impact on the development of the family business after graduation.

4. METHOD AND MATERIALS

4.1. Data collection and methodology

The aim of this paper is to examine the trend of students' attitude towards the family business. For this purpose, a survey from the research of Živković et al (2012), was used. Data was collected in 2012 (320 respondents), in 2022 (35 respondents) and in 2023 (43 respondents). Respondents present students of Technical faculty in Bor.

The questions are divided into several groups: (1) Locus of control, (2) Entrepreneurial self-efficacy, (3) Independence motive, (4) Innovation motive, (5) Motivation for growing own business.

Students expressed their agreement on the 6 points scale: (1) Don't agree at all, (2) Don't agree, (3) Hardly agree, (4) Partly agree, (5) I agree, (6) Completely agree. In this paper

comparative analyse has been used. Students' average agreement/disagreement for all five family business motive groups have been calculated for three periods of time. Results are presented in part Results and discussion.

5. RESULTS AND DISCUSSION

Figure 2 shows students' average agreement/disagreement on questions which belongs to the Locus of control.

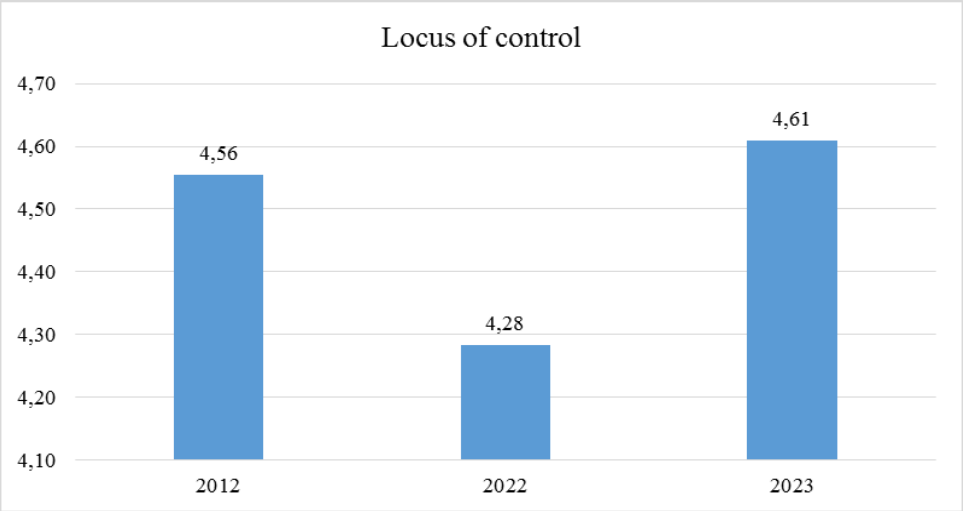


Figure 2. Students' average agreement/disagreement for questions which belongs to the Locus of control in 2012, 2022 and 2023 (source: authors)

As it can be seen from the Figure 2, Locus of control had the highest mark in 2023 and the lowest in 2022. Having on mind that data were collected at the beginning of 2022, it was still the COVID period and feeling for locus of control was lower. Figure 3 presents students' average agreement/disagreement on questions which belongs to the Entrepreneurial self-efficiency as motive for starting of family business or its further development.

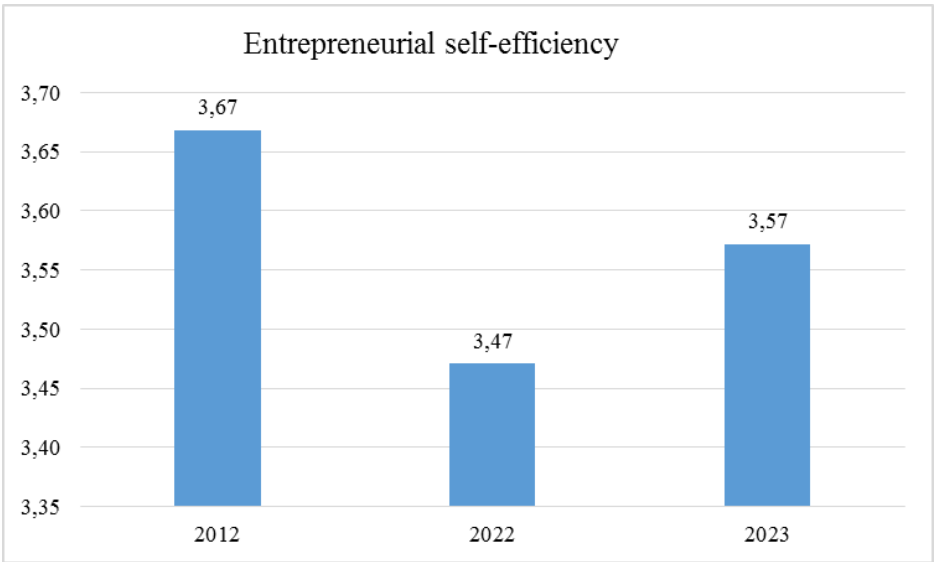


Figure 3. Students' average agreement/disagreement for questions which belongs to the Entrepreneurial self-efficiency in 2012, 2022 and 2023 (source: authors)

As Figure 3 shows, in 2012 Entrepreneurial self-efficiency had the highest mark and the lowest in 2022. Figure 4 shows, on the other hand, students' average agreement/disagreement on questions which belongs to the Independence motive.

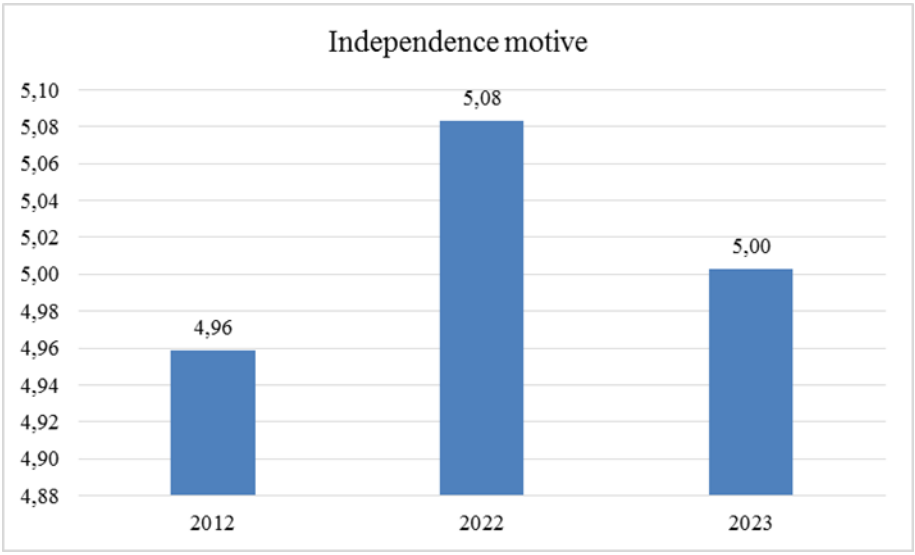


Figure 4. Students' average agreement/disagreement for questions which belongs to the Independence motive in 2012, 2022 and 2023 (source: authors)

As Figure 4 shows that Independence motive had almost the same high average mark in all three mentioned time periods. This result is expected and previous studies also have showed that Independence motive is very high ranked among students. This is actually one of the most important motives from students' perspective for starting own business or inheriting family business (Mawardi & Sahputri, 2022).

Figure 5 shows students' average agreement/disagreement on questions which belongs to the Innovation motive.

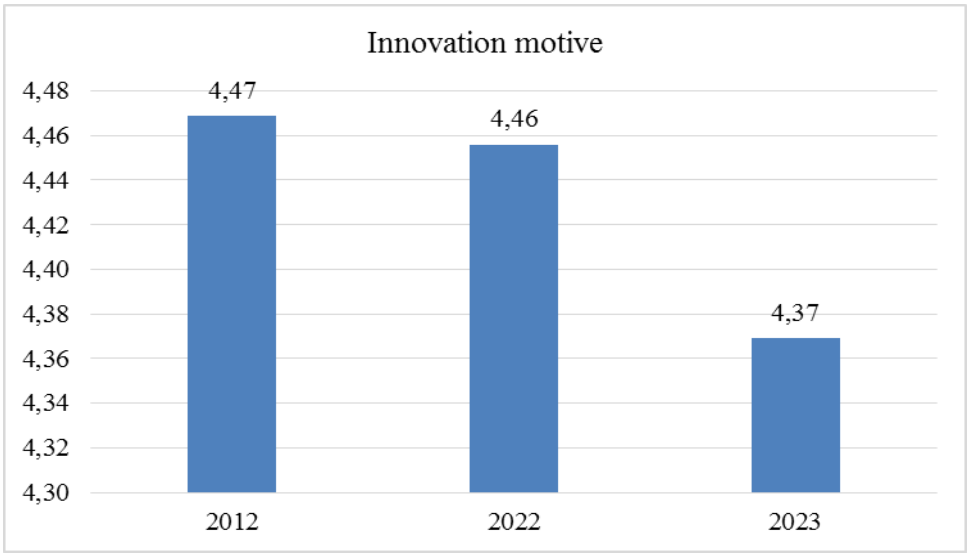


Figure 5. Students' average agreement/disagreement for questions which belongs to the Innovation motive in 2012, 2022 and 2023 (source: authors)

As it can be seen from the Figure 5, Innovation motive had the highest mark in 2012 and the lowest in 2023 with delay that there is no big difference in average marks. 21th century is era of innovation and innovation is stimulation for entrepreneurial intention (Dragin et al., 2022).

Figure 6 shows students' average agreement/disagreement on questions which belongs to the Motivation for growing own business.

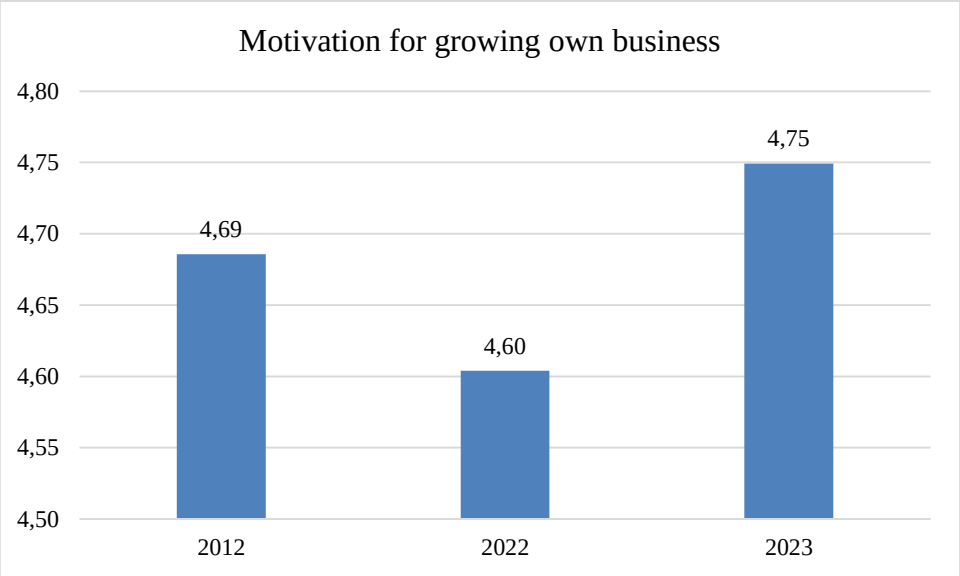


Figure 6. Students' average agreement/disagreement for questions which belongs to the Motivation for growing own business in 2012, 2022 and 2023 (source: authors)

As Figure 6 shows, Motivation for growing own business had lowest average mark in 2022. It can be said that COVID-19 had some impact on Motivation for growing own business because the previous research which was conducted during the pandemic of the COVID-19 virus, and the fact is that entrepreneurship suffered many negative effects (Maksimović & Cvetićanin, 2021). The post-COVID period has led to some extent to the market stabilization, so it is expected that the average mark increased again in 2023.

6. CONCLUSION

Students' entrepreneurial intention is very common topic and researchers' interest in this topic is growing more and more.

In this paper entrepreneurial students' intention was analysed. Data were collected in three time periods and comparative analyse for five groups of motive was performed. Results shows that in 2012, 2022 and 2023 were almost similar, but also there were some oscillations.

In all three considered periods only two motives (Independence motive and Innovation motive) were on the same high level while the rest threer groups of motive had lower marks. It leads to conclusion that COVID period has significant impact on students' entrepreneurial intention.

Locus of control, Entrepreneurial self-efficiency and Motivation for growing own business as motives have been stabilized in post-COVID period which was expected.

Innovation motive only has negative trend according to the average marks because there are a lot of innventions in last two centuries and students may do not see much more space for a radicale innovations.

We must also consider the environmental factors that affect the present results, i.e., first and foremost, a better economic situation and a higher level of employment, which directly affect the decrease in the number of students and their motivation for entrepreneurship.

This study, also, has some limitation. First, research mentioned in this paper refers to 2012, second refers to 2022 (which is ten years in between), while third period refers to 2023 (which is a year in between). Furher researches should be performed every year or every second year for tracking motives of students' entrepreneurial intention.

REFERENCES

Audretsch, D. B. (2009). The entrepreneurial society. The Journal of TechnologyTransfer, 34(3), 245-254.

Bergmann, H., Hundt, C., & Sternberg, R. (2016). What makes student entrepreneurs? On the relevance (and irrelevance) of the university and the regional context for student start-ups. Small business economics, 47(1), 53-76.

Chaudhary, S., Dhir, A., Ferraris A., & Bertoldi B. (2021). Trust and reputation in family businesses: A systematic literature review of past achievements and future promises. Journal of Business Research 137(2021), 143–161.

Cieślik, J., & Van Stel, A. (2017). Explaining university students' career path intentions from their current entrepreneurial exposure. Journal of Small Business and Enterprise Development, 24(2), 313-332.

CMJP (2018). Results of the research "Attitudes of University of Belgrade students on youth entrepreneurship in the Republic of Serbia". Centre for International Public Policy. Available at: http://cmjp.rs/vp-content/uploads/2018/03/Rezultati.pdf. (Accessed in April, 2023). (In Serbian).

Djazilan, M. S., & Darmawan, D. (2022). Entrepreneurship Education and Family Support: The Determinants that Appear Entrepreneurship Interest for Students. International Journal of Service Science, Management, Engineering, and Technology, 1(2), 26-30.

Dragin, A. S., Mijatov, M. B., Munitlak Ivanović, O., Jovičić Vuković, A., Ivkov Džigurski, A., Košić, K., Nedeljković Knežević, M, Tomić, S., Stankov, U., Vujičić D. M., Stojanović, V., Ivanović Bibić, Lj., Đerčan, B. & Stoiljković, A. (20). Entrepreneurial intention of students (managers in training): Personal and family characteristics. Sustainability, 14(12), 7345.

Edelman, L. F., Manolova, T., Shirokova, G., & Tsukanova, T. (2016). The impact of family support on young entrepreneurs' start-up activities. Journal of business venturing, 31(4), 428-448.

Egerová, D., Eger, L., & Mičík, M. (2017). Does entrepreneurship education matter? Business students' perspectives. Tertiary Education and Management, 23(4), 319-333.

GEDI (2018). Global Entrepreneurship Index 2019. Global Entrepreneurship and Development Institute. Available at: https://thegedi.org/2019-globalentrepreneurship-index. (Accessed in April, 2023).

Jovin, S., & Jošanov Vrgović, I. (2018). Entrepreneurial intentions of students of higher vocational schools on the territory of Autonomus province of Vojvodina. School of Business, 2/2018, 12-30.

Jovin, S., Papić-Blagojević, N., Jošanov-Vrgović, I., & Jovičić Vuković, A. (2018). Factors of development of entrepreneurial creative ideas of students of higher vocational schools. In: XXIV Conference Development Trends. Kopaonik. (In Serbian).

Kayid, W., Jin, Z. Priporas C., V., & Ramakrishnan, S. (2022). Defining family business efficacy: An exploratory study. Journal of Business Research, 141(2022), 713–725.

Lévesque, M., & Minniti, M. (2011). Age matters: how demographics influence aggregate entrepreneurship. Strateg. Entrep. J. Published online in Wiley Online Library (wileyonlinelibrary.com). 5, 269–284.

Libek (2015). Available at: https://libek.org.rs/uploads/files/1430826083.O7D72SKzVROwm9KG.pdf. (Accessed in April, 2023).

Maksimović, M. T., & Cvetićanin, N. V. (2021). Geoeconomics and Entrepreneurship during the COVID-19 Pandemic. Sociological Review, 55(3), 930-952. (In Serbian).

Marčetić M. & Mušikić S. (2020). Exploring the influence of gender differences on attitudes of young students of economics toward entrepreneurship in Serbia, Ekonomija, Teorija i Praksa, 13(2), 77-95. (In Serbian).

Marques, C. S., Santos, G., Galvão, A., Mascarenhas, C., & Justino, E. (2018). Entrepreneurship education, gender and family background as antecedents on the entrepreneurial orientation of university students. International Journal of Innovation Science, 10(1), 58-70.

Mawardi, M. K., & Sahputri, R. A. M. (2022). The effect of entrepreneurship education and family entrepreneurship on student entrepreneurship intention. Jurnal Aplikasi Manajemen, 20(2), 445-460.

Mustapha, M., & Selvaraju, M. (2015). Personal attributes, family influences, entrepreneurship education and entrepreneurship inclination among university students. Kajian Malaysia: Journal of Malaysian Studies, 33(1), 155-172.

Perez-Perez, C., Gonzalez-Torres, T., & Najera-Sanchez, J., J. (2021). Boosting entrepreneurial intention of university students: Is a serious business game the key? The International Journal of Management Education, 19(3), 1-14.

Pitchbook (2020). Pitchbook Universities: 2020. Available at: https://pitchbook.com/news/articles/pitchbook-universities-2020?utm_medium=nl-na&utm_source=reports&utm_campaign=PitchBook-Universities-2020. (Accessed in April, 2023).

Radić, A., Stojanović, A., & Nikolić, I. (2022). Analysis of the attitude of the student population towards the family business. International May Conference on Strategic Management (IMCSM22). May 28, 2022, Bor, Serbia. IMCSM Proceedings, 17(1), 557-566.

Rovelli, P., Ferasso, M., De Massis, A., & Kraus, S. (2021). Thirty years of research in family business journals: Status quo and future directions. Journal of Family Business Strategy, 13(3), 1-17.

Sandi, A., & Nurhayati, M. (2020). Effect of entrepreneurship education, family environment and self-efficacy on students entrepreneurship intention. In 4th international conference on management, economics and business (ICMEB 2019).

Sugianingrat, I. A. P. W., Wilyadewi, I. I. D. A. Y., & Sarmawa, I. W. G. (2020). Determination of entrepreneurship education, family environment, and self-efficacy on entrepreneurship interest. Jurnal Economia, 16(1), 33-43.

Valdez-Juárez, L. E., & Pérez-de-Lema, D. G. (2023). Creativity and the family environment, facilitators of self-efficacy for entrepreneurial intentions in university students: Case ITSON Mexico. The International Journal of Management Education, 21(1), 1-24.

Živković, D., Živković, Ž., Nikolić, I., Nikolić, N., Manasijević, D., & Vadnjal J. (2012). Study of student population relationship to family business in example of Technical Faculty in Bor, May Conference on Strategic Management, 25 - 27 May 2012, Bor, Serbia (In Serbian).

Volume XIX, Issue (1) (2023) 587-593

International May Conference on Strategic Management

NEW QUESTIONS OF THE NEW, VIRTUAL WORLD

András Keszthelyi*

Keleti Károly Faculty of Business and Management, Óbuda University, Hungary

Abstract: The revolutional development of infocommunication technologies (ICT) has resulted in a paradigm shift and this paradigm shift is still in progress. This evolving new era is usually called information age but we could rather call it virtual world because the fact that the digital network (internet) endpoints are in our hands and in every field of our life we use the internet. The written rules (law) and the unwritten rules (tradition) of a society are developed slowly. The virtual world is so new that the new rules of this new world hasn't been clarified yet. In this paper I present some questions and problems of the virtual world that cannot be answered on the basis of the traditional world by analysing the related news of about the last two decades.

Keywords: ethics, ICT ethics, virtual world

1. INTRODUCTION

The personal computer (PC) project of IBM started in the 1970s in the form of electronic kits. Soon it became clear that the future was not the electronic kits to be assembled but the out-of-box, ready-to-use desktop computers. At the beginning the development of the personal computers was quite slow but it became more and more quick. The turning point might be in 1993 when after the Intel i8088, i80286, i80386, i80486 processors the next generation was given a name by the marketing department. Development of PC turned to exponential. The network of computers started at the very end of 1969.

By 1990 the PC and network accessing became quite general. Those who really wanted could manage to have their own personal computers connected to the network. At those times "network" meant that one could send and receive emails, use FTP (file transfer protocol, a command-line tool for downloading or uploading files from or to remote machines) and it was also possible to lo in into remote computers.

Tim Berners-Lee (1989) in CERN started the web project at that time and in a couple of years it spread all over the world and, most probably, we couldn't even imagine our lives without it nowadays. In a few years all the file formats were invented that are necessary to manage anything in every particular field of life from different office related file formats through Adobe's Portable Document Format to MP3 and MP4 for music and movies.

The most important services also started soon and quickly in every field of life from Google Search through certificate authorities to PayPal, Über, booking.com, bank cards, etc.

Nowadays people (each of us) have the digital network endpoint equipment not only in their desks in the form of personal computers but also in their hands in the form of smartphones in every minute. Something that originally was a tool, an equipment for

* *Corresponding author: keszthelyi.andras@kgk.uni-obuda.hu*

professionals, scientist because integrant part of our everyday life and most people cannot even imagine their lives without being present on the internet continuously.

The impact of this on us is so important and substantial than the impact of the steam engine was at the beginning of the industrial revolution or the invention of book-printing by Gutenberg. Thus we can call our age, beyond other names, as a (the) virtual world.

2. DIFFERENT ENVIRONMENTS OF MANKIND

According to Szűcs (1981) mankind has three different environments. The very first and fundamental one is our biological environment ("the nature") as we are animate, biological beings. The next environment, or the next level is our social environment as we have been living in less or more complex societies since the beginning of history. The third environment of us is the technical environment as it is so substantial for us that we couldn't live without or beyond it.

Nowadays it is quite an interesting question whether or not the infocommunication technologies (ICT) can be considered as a fourth, standalone environment of us or it is only part of our third, technical environment. On one hand it cannot be denied and even the name indicates that ICT is part of the more general technical environment. On the other hand it is so complex, influences our life so seriously and fundamentally that, yes, it can be considered as a fourth, standalone environment of us. It should be considered that way. As I'm pointing it out it has its own ruleset and this also indicates that ICT is the fourth environment.

Each of these environments has its own ruleset that cannot be (or must not be) tampered with.

As biological beings we are part of our biological environment and its rules are valid and obligatory for us, e.g. Liebig's law of the minimum. Or if you go out in winter for too long in too few clothes you'll, most probably, get cold.

In the society where we live together as fellow beings the ruleset consists of a large number of different level subsets. There is the law in force as the topmost level of formal or written rules and below them the large amount of different statutes and decrees, down to the regulations of the company we work for. In addition to that there are also a large number of unwritten rules that control our everyday life, such as at a doorstep ladies are supposed to be let enter first – with the exception of restaurants and pubs.

These rules are results of a lot of communications to each other, experiences collected for long times. They are sort of agreements at different levels. Most of them are subjective, less or more, depend on the development level of the society and the different agreements that the different groups could and did make.

Our technical environment also has its own, specific ruleset. Examples are the different standards such as the ISO metric screw threads and the different rules of nature, e.g. Newton's 2nd law or gravity, etc. Some of these rules are objective and some of them are subjective. Newton's laws are objective while the ISO metric screw threads standards are subjective, result of many practical experiences and cooperation and agreements.

The ICT-environment should be considered as our fourth environment because of not only its serious impact on our everyday life but its very special own rules as well. This environment is a very interesting one, maybe the most interesting of the four. Some of its rules are so strange that there have never been even similar rules.

The most important of these specific rules is that we, on the digital network or in the virtual world, can create as many copies of anything as many we want in no time and at no cost, practically. These copies are all of the very same quality as the original. These copies can be transferred to anywhere, also in no time and at no cost, practically. We've never had

this opportunity before, in the whole history of mankind. There are some consequences of this.

First of all: if you can see your car where you left it earlier it means that your car hasn't been stolen (yet). If you switch on your computer, either your personal laptop or the big database cluster of your company and you find all your data there in the same state as it was earlier it doesn't mean that your data haven't been stolen yet, maybe many time and by many people.

Your computer (either your desktop or your smartphone) may not be only yours and it is significantly harder to detect that someone else also uses your box than to detect in the traditional word that someone else uses your car, too. Look at the different viruses, malware.

Then appearances are much more deceiving in the virtual world than in the physical world. Look at, e.g., Facebook and Instagram posts. This is because of the next rule.

If someone would steal your car in the traditional world you could be absolutely sure that the guy was in person on the spot at the exact time of the stealing. In the virtual world there is no need to be anywhere at any time whatever you do.

Traditional bombs can be used only once. Digital bombs, such as malware, can be detected, searched for, found and then re-used even against its original developers. See the example of the Stuxnet virus (King, 2012).

In other words at least some of the rules of the virtual world are not affected by traditional rules of the nature. Especially the role of the physical distance and the time seems to be reduced or disappeared.

3. RULES OF RULES

Generally speaking rules can be put into two groups. There are objective and subjective rules. Objective rules are given by nature, e.g. Newton's 2nd law or Pythagorean theorem. Their existence and validity is general, eternal and cannot be questioned. Subjective rules are set up by people, such as different laws or other rules. They can be changed after some time if necessary. As our experiences and knowledge evolves these rules also develop.

There is some basis for the mankind-made rulesets that can be considered as objective. For example the “Thou shalt not kill” or the “Honour thy father and thy mother” commandments have always been strongly valid. Generally, in practice, they were not always stictly kept but their being of general rules was never questioned in history. People have the ability to distinguish between bad and good. “All human beings (...) are endowed with reason and conscience” (UN, 1948).

The formal rules, different laws of the society are, generally, based on the common sense and conscience of people and thus they can be considered as the common judgement of the society. These rules make it possible to live together in a very complex society without having a lot of serious problems continuously. These rules are for the regulation of the most frequent and most serious problems. There may be special situations what the formal rules cannot deal with, cannot regulate (yet) especially when something very new is invented and introduced in the society.

In such situations our conscience can help to decide what to do and what not to do.

4. ETHICS

“Unwritten rules do exist and those people who sometimes make the written rules a little bit softer must strictly keep them.” (Rejtő, 2014). It means that the formal rules of the society are not able to deal with every possible problem and situation, especially not

immediately when they occur. Slower or quicker (rather: slower) it can follow the changes in the challenges the society has to face with so they evolve but they are never absolutely perfect for any possible situation and problem.

In such cases the importance of the so-called unwritten rules or ethical rules will increase. Ethical rules are not arbitrary agreements, they are based on the conscience of people. Some general, basic rules of ethics are:

- truth exists,
- people have reason and conscience (as cited above),
- truth can be recognized sooner or later,
- recognition and judgement can and must evolve.

As the virtual world is rather a new one and because its virtuality there are a lot of very new and unexpected problems and questions and situations that the law cannot yet control, the role of ethics is much more important.

5. QUESTIONS AND PROBLEMS

I have been collecting professional news for about twenty years. This collection is the basis of discovering the special rules of the virtual world discussed above. And, also, they describe a lot of problematic situations and questions of which I'm presenting the most important ones. Some of them seems to be answered in the meantime and thus they are good examples of the development of value judgement of the society.

Copyright related questions, in case of text (books), music, and movies. In the traditional world, or analogue world, these items could be copied, of course, but the copying process itself was time-consuming, expensive and because the process itself was analogue the quality of the copies were less than that of the original. Similarly, the quality of a copy is reduced by the normal use, too. This physical constraint does not exist in the virtual world of the digital network(s).

Paperback books are not re-printed often, especially not if they are of narrow interest. Should they be considered as left forever? Some years ago Google wanted to start a project to digitalize all the books of the world but they had to give it up because copyright rules. The rule says (in Hungary at least) that after the death of the last author of a book seventy years must elapse and only after that it will become free. Seventy years mean two generations.

Should books, that cannot be bought in paperback and are not going to be printed by the a publisher, be lost forever for the younger generations?

For musc the lossy compression methods were invented soon (mp3). Anyone could and can do that quite easily and quickly. These files can be then copied and transferred also very easily. Big record label companies had (and have) enough power to provide deterrent examples. A very famous example for this is the file sharing case of Capitol Records against Thomas-Rasset. In this case the social worker Jammie Thomas-Rasset was sentenced to pay 1.5 million US dollars for sharing two dozen mp3 format songs. (EFF, 2012). Okay, it was a deterrent example but is it correct to pick up a single person to intimidate the whole society when everyone has the technical possibility to convert music to mp3 and share it with other folks? Can a whole society be criminalized for using a standard possibility?

Slowly a new business model spread. Bands themselves upload their music for free onto YouTube.com and/or onto their homepages. It then serves as a promotion to recruit people, or more people, to the concerts. Selling music on compact discs make nearly no profit for the musicians, maybe for the most famous ones.

"... papers using actual file-sharing data, suggest that piracy and music sales are largely unrelated. In contrast, there is clear evidence that income from complements has risen in

recent years. For example, concert sales have increased more than music sales have fallen." (Oberhozer-Gee & Strumpf, 2009).

In case of movies the situation was similar to music. The common phrase was that each downloadin of a movie means one less cinema ticket and the whole movie industry would soon go bankrupt. It was not true, obviously, for the low number of cinemas will guarantee that only the new movies can be watched and sometimes the most famous old ones.

In Hungary a recent research found that about three quarters of the movies that could be accessed via torrent trackers were not available in cinemas at all or only very long time ago (Bodó & Lakatos, 2010). So, in short, it is simply not true that one downloading equals to one less cinema ticket.

The new business model is similar to the traditional book-libraries. For a (less or more) reasonable fee one can get access to a large collection of movies at one place, of good quality and in a searchable environment. If the fee is really reasonable it is not worth the time and energy to deal with copying, tormenting, grabbing, etc. of movies, even if the technology is ready for use for everyone.

Software is more interesting and problematic than books, music or movies. If it is used for industrial purposes, to make money, it is obvious that the company or the guy should buy the software. But what to do, if someone wanted to test the software whether or not it fits for their special purposes? What to do if a student wanted to study how given software without free academic licence works?

Internet usage, fake news, censorship, generally: content filtering. At companies the management decides the rules of internet usage of the employees. Employees, generally speaking, are supposed to work at their workplaces and on the devices provided them by their employer. But what should be the correct solution in case of BYOD (bring your own device) and the official and private use of user devices cannot be distinguished? Should, e.g., Facebook delete so-called fake news and ban pages because of so-called hate speech? If yes, who and how should (may) decide what is fake news and what is hate speech?

Schools are required to teach the pupils as well as to give them social, moral and intellectual education, too.. The case of students and schools is similar to that of the employees and companies. Children are supposed to be under some teacher supervision. But what to do if the school rules are different from the family rules? Family rules are (must be) more important than school rules, but how could a school set and check different set of rules for different pupils?

What are the limitations of the freedom to access different information? Should the local government or the state finance the accessing of, e.g., porn sites or not? Should they make any or all possible effort to prevent access to some unwanted content? Where is the beginning of censorship? What if a team wanted carry out a research to find hidden information in porn galleries (steganography)? What would we say about the Great Firewall of China?

Freedom of speech and anonymity. In everyday life internet users can be identified by the help of their internet service provider, even post factum. Should the ISP hand over user data to the police? If there is a legal warrant? Formally: yes, but what to do in a dictatorship?

"Google and Yahoo! have recently attracted much negative publicity - the former for agreeing to censor results in its Chinese search engine, the latter for supplying details to the authorities on two "dissidents" - Li Zhi and Shi Tao - who were subsequently jailed." (Haines, 2006.). Is this okay?

Where is the red line between private conversations and publication? If a user shares his or her opinion with his/her 200 friends on a social media page, should that be considered as private? And what if the friends of the guy also share that message with their 200 contacts so

it reaches 40.000 people? Who is responsible (and for what)? The original author? The friends who shared the original opinion?

Look at the case of the Hacking Team, a "firm made famous for helping governments spy on their citizens left exposed" (Ragan, 2015). FinFisher, FinSpy software tools of Gamma International also should be mentioned here and Pegasus. Gamma was hacked. A lot of its documentation was published and this drew the attention to the spying activities of the allegedly democratic governments against their own citizens.

Is it ethical to ruin the privacy of the citizens by a (any) government? Is it ethical to publish any information regarding these activities, such as Edward Snowden did it? Is it ethical or not to publish any documentation that describe the tortures in Guantanamo carried out by the government of the democratic USA on people who have been kept in prison since 2002 without a sentence? WikiLeaks published such information. Was it ethical or not?

Edward Snowden used Lavabit's email service for communicating. Lavabit promised a secure email service to its users. When Snowden's scandal broke out, the police, obviously, wanted to check Snowden's mailbox. They provided a search warrant to acquire all of the SSL keys of Lavabit and that meant that they would have become able to decrypt all the mail traffic of all the Lavabit users and not only of the one Edward Snowden. "Lavabit's CEO, LadarLevison, compelled to hand over the five SSL private keys, did so in printed form, using a 4-point font spread across 11 pages. Law enforcement were not chuffed. After handing the keys over, Levison promptly shut his 10-year-old business down in August in order to protect customers' data." (Munson, 2014).

Is that ethical if authorities set up traps? "A man in Australia is believed to be the first to have been convicted as the result of an undercover sting in which charity workers posed online as a 10-year-old Filipina." (Crawford, 2014). May an adolescent boy (or an elderly guy) be arrested if he masturbates on young Olsen twins poster?

What law should be applied if the service provider is an enterprise in one country, the data center is in a second country while the user is the citizen of a third country? "It's been fighting the issue in court since August, when it refused to comply with a warrant for a user's email that was stored in a Dublin data center." (Vaas, 2014).

What decisions a self-driving car should or should not make if it cannot avoid a sudden accident? Whose lives should it (try to) save? The passengers' lives? The pedestrians'? Does the answer depend on what kind of people are in the car and around it? (Madarász & Szikora, 2019).

In which countries should companies like Facebook and Google pay taxes? Where there is their headquarters, where they run their servers, or where their customers come from?

6. CONCLUSION

There are a lot of other examples and questions. In a quickly changing world ethics is significantly more important than in the traditional world in which both the written and unwritten rules are well-known and well-established and accepted by the society. This means that the importance of formal and informal education is greater than ever, at schools as well as at enterprises and at home, in the family.

The subject knowledge in alone is not enough and/or may be obsolete. Training and teaching is an important investment both in the fields of ICT and general ethics. A better strategy is to develop the culture of using ICT, especially its security-related sub-fields. Individual factors influence individual behaviour in relation to organisational safety and security. Good culture means less opportunity for risk behaviour as described in (Lazányi,

2014). Nowadays the most important question is if we can develop a livable world for our children, a world in which important rules do exist for all of us.

REFERENCES

Links checked on 29/04/2023 unless stated otherwise.

Berners-Lee, T. (1989). "Information Management: A Proposal". w3.org. The World Wide Web Consortium

Bodó, B., & Lakatos, Z. (2010) Afilmek online feketepiacaés a moziforgalmazás [Online black market of movies and cinema distribution] In: SzociológiaiSzemle, 20(3), 34-75. Online (in Hungarian): http://www.szociologia.hu/dynamic/szocszemle_2010_3_all.pdf

Chertoff, M., & Simon, T. (2015). The Impact of the Dark Web on Internet Governance and Cyber Security. In: Global Commission on Internet Governance, paper series: No. 6., Feb. 2015. https://ourinternet-files.s3.amazonaws.com/publications/GCIG_Paper_No6.pdf

Crawford, A. (2014). Webcam sex with fake girl Sweetie leads to sentence. BBC News, 21.10.2014., http://www.bbc.com/news/technology-29688996

Haines, L. (2006). Google and Yahoo! take a beating. In: The Register, 16. 02. 2006. https://www.theregister.com/2006/02/16/china_committee/

EFF (2012). Capitol v. Thomas.Electronic Frontier Foundation, 11. 09. 2012. https://www.eff.org/cases/capitol-v-thomas.

King, R. (2012). Stuxnet Infected Chevron's IT Network. Wall Street Journal, 8 November 2012. https://www.wsj.com/articles/BL-CIOB-1156

Madarász, N., & Szikora, P. (2019). Opportunities and dangers of self driving cars. In: Fehér-Polgár, Pál; Garai-Fodor, Mónika (ed.) FIKUSZ 2018 - Symposium for Young Researchers Proceedings. Budapest, Hungary: Óbuda University, Keleti Károly Faculty of Business and Management. 514 p. pp. 280-288.

Munson, L. (2014). Lavabit appeals contempt of court ruling surrounding handover of SSL keys. Naked Security, Award-winning security news from Sophos, 29. 01. 2014. http://nakedsecurity.sophos.com/2014/01/29/lavabit-appeals-contempt-of-court-ruling-surrounding-handover-of-ssl-keys/

Rejtő, J. (2014). Excellent guy (in Hungarian: Legény a talpán). ISBN 978-615-5406-44-7 (online)

Oberholzer-Gee, F., & Strumpf, K. (2009). File-Sharing and Copyright. NBER's Innovation Policy and the Economy series, volume 10. ed. Joshua Lerner and Scott Stern. MIT Press. 2009. Online: http://www.unc.edu/~cigar/papers/File-Sharing_and_Copyright_2009-05-16.pdf Link checked on 5/6/2012

Ragan, S. (2015). Hacking Team hacked, attackers claim 400GB in dumped data. CSO Online, 05. 07. 2015. https://www.csoonline.com/article/2943968/data-breach/hacking-team-hacked-attackers-claim-400gb-in-dumped-data.html

Szűcs, E. (1981). Technique and system. (in Hungarian) Tankönyvkiadó, Budapest.

UN (1948). Universal Declaration of Human Rights. https://www.un.org/en/about-us/universal-declaration-of-human-rights

Vaas, L. (2014). Microsoft deluged with support in its email privacy battle against US government. Naked Security, Award-winning security news from Sophos, 17. 12. 2014. https://nakedsecurity.sophos.com/2014/12/17/microsoft-deluged-with-support-in-its-email-privacy-battle-against-us-government/

Volume XIX, Issue (1) (2023) 594-604

International May Conference on Strategic Management

ANALYSIS OF THE WESTERN BALKANS COUNTRIES' INNOVATIVE SYSTEMS

Aleksandra Fedajev, Marija Panić*, Živan Živković

University of Belgrade, Technical Faculty in Bor, Serbia

Abstract: While the Western Balkan (WB) countries have been actively seeking membership in the EU, their level of development is diverging more and more from that of the EU as a whole. Along with the protracted reform processes and numerous political and social unrest, these nations' lack of innovation should be considered a possible cause of these results. Based on information from the GII report for 2021, this research seeks to conduct a comparative analysis of the innovation in the WB countries and pinpoint their major advantages and disadvantages in this area. According to the results, Serbia is the top-ranked country when all factors are considered. The results have outlined some recommendations and instructions for economic policymakers in these countries to enhance innovation in the future.

Keywords: Innovation, GII, Innovative system, Western Balkan

1. INTRODUCTION

Following each global crisis, the Western Balkan (WB) countries' capacity for development gradually deteriorates (Kikoni, 2020). These countries export human resources on a net basis (World Bank, 2019). These factors substantially impact these countries' capacity for innovation (Jardon, 2016; Li & Tang, 2017; Calabrò et al., 2021; Jagódka & Snarska, 2021). The development of science and technology, as well as higher education quality, are crucial prerequisites for innovation development (Erić, 2018; Agerberg, 2019; Agasisti & Bertoletti, 2020). It is essential to make enough investments in science, ensure that universities are well-connected to the economy, and actively support this sector (Docampo, 2013; Živković et al., 2017; Avelar et al., 2019). This sociopolitical environment's lack of investment in higher education has prevented these institutions from developing and prevented the country from achieving its long-term strategic goals in this area (Brajković, 2016). A stimulating business environment also plays a vital role in developing innovation. A dynamic corporate environment is essential for the growth of innovation. The stability of the innovation climate is facilitated by a supportive political environment (Cooray, 2009; Lendel, 2010; Baumann & Kritikos, 2016). The WB countries must enhance the environment for innovation development in these circumstances, focusing especially on those areas that do not necessitate considerable financial resources.

This study uses data from the Global Innovation Index (GII), which condenses the main factors affecting innovation and the outcomes of all types of innovative activity (WIPO, 2021). This article aims to conduct a multicriteria comparative analysis of the innovation in the WB countries and highlight the major advantages and disadvantages of these economies in

* *Corresponding author: mpanic@tfbor.bg.ac.rs*

terms of innovation. To determine the current state in this region, data from the GII report for 2021 were used. The fact that this is one of the few articles that deal with innovations in this region systematically speaks to the importance of this research. Numerous options exist for the findings to be visually shown when the PROMETHEE method is applied using the Visual PROMETHEE software.

2. LITERATURE REVIEW

Innovation is frequently seen as a key factor in a company's performance from a microeconomic perspective (Coad et al., 2016; Rubera et al., 2016; McCormik & Fernhaber, 2017). Improved work organization practices in businesses and their interactions with related businesses and the academic community lead to innovation (Hasan & Tucci, 2010; Zhu et al., 2011). From a macroeconomic standpoint, innovation is important in driving economic growth, employment growth, and rising living standards (Schumpeter, 1950; Colombelli et al., 2013; Despotović et al., 2014). Innovation enables the economy to respond to global issues more successfully (Paredes-Frigolett et al., 2021). According to Diaconu (2011), the emphasis on innovation is being made because of the widening gap between developed and developing countries due to wealthy nations' attention to measures to spur economic development through invention.

Long-term prerequisites for WB countries' economic and social survival and development include increasing the economy's capacity for innovation and enhancing competitiveness (Balkytė & Tvaronavičienė, 2010). Regarding innovation, the WB countries fall considerably short of the EU members (Despotović et al., 2014; Kostoska & Hristoski, 2017). In the case of these countries, there is no statistically significant correlation between innovation and competitiveness (Cvetanović et al., 2014). In general, these countries' infrastructure is of much worse quality than that of the EU (Atoyan et al., 2018).

The innovativeness of the WB countries is the subject of very few papers. Typically, they are examined in a wider context, either with EU members (Aytekin et al., 2022) or with Southern and Eastern Europe countries (Ramadani et al., 2019; Cvetanović et al., 2020). Most of the publications (Pilav-Velić & Marjanović, 2016; Klisaroski, 2018; Jovanović, 2018; Savić et al., 2018; Lagumdžija et al., 2019; Trbovich et al., 2020) are concerned with innovation in several of these countries. This paper adds to the literature on innovation, which is currently lacking in studies.

3. DATA AND METHODOLOGY

The World Intellectual Property Organization (WIPO) has published country ranking results based on the Global Innovation Index (GII) values since 2011. The GII examines a country's level of innovation development using seven innovation pillars split into inputs and outputs. Among the inputs are institutions, human resources and research, infrastructure, market sophistication, business sophistication, and associated sub-areas (WIPO, 2021).

The GII 2021 report data (WIPO, 2021) examined innovation in WB countries. The examination covers Albania, Bosnia and Herzegovina (B&H), Montenegro, Northern Macedonia, and Serbia. In terms of socialist heritage, turbulent social, economic, and political transitions, an underdeveloped institutional and regulatory environment, the state's continued substantial engagement in the economy, and bad economic results, WB countries share many characteristics. On the other hand, these countries vary in terms of the progression and transition toward EU membership (Jusić & Obradović, 2019). The multicriteria analysis

covers the comparative analysis of innovation in WB countries. In this study, the PROMETHEE and Entropy methods are employed.

3.1. Multicriteria analysis model setting up

The multicriteria analysis model settings are shown in Table 1. The weights were computed via the entropy method. The preference threshold was determined using the standard deviation and expressed in absolute amounts using the V-shape preference function. The WB countries received rankings using the assessed criteria in multicriteria analysis settings.

Table 1. The multicriteria analysis model setting

Criteria	Weights	Direction of preference	Preference function	Preference threshold (p)	Threshold type
Political environment	0.040	max.	V-shape	4.98	absolute
Regulatory environment	0.042	max.	V-shape	4.95	absolute
Business environment	0.041	max.	V-shape	6.03	absolute
Education	0.057	max.	V-shape	8.49	absolute
Tertiary education	0.049	max.	V-shape	5.13	absolute
R&D	0.044	max.	V-shape	3.54	absolute
ICT	0.046	max.	V-shape	5.27	absolute
General infrastructure	0.044	max.	V-shape	2.73	absolute
Ecological sustainability	0.061	max.	V-shape	5.48	absolute
Credit	0.052	max.	V-shape	4.30	absolute
Investment	0.048	max.	V-shape	19.02	absolute
Trade, competition and market scale	0.040	max.	V-shape	7.48	absolute
Knowledge workers	0.054	max.	V-shape	4.15	absolute
Innovation linkages	0.052	max.	V-shape	2.78	absolute
Knowledge absorption	0.050	max.	V-shape	5.76	absolute
Knowledge creation	0.043	max.	V-shape	6.79	absolute
Knowledge impact	0.044	max.	V-shape	6.23	absolute
Knowledge diffusion	0.043	max.	V-shape	7.31	absolute
Intangible assets	0.051	max.	V-shape	4.91	absolute
Creative goods and services	0.037	max.	V-shape	3.93	absolute
Online creativity	0.061	max.	V-shape	14.66	absolute

Source: Authors' calculations.

4. RANKING RESULTS AND DISCUSSION

The WB countries were ranked using the indicators obtained from the GII 2021 database and the multicriteria analysis model setting up. Serbia is the WB country with the greatest positive net flow of preferences, as seen in Table 2. B&H is ranked fourth, just below last-placed Albania, with a negative net flow of preferences. Serbia and N. Macedonia have switched places in the PROMETHEE method results. Otherwise, the ranking of the countries is the same as that in the GII report. These outcomes are the consequence of various

weighting coefficients, which modify the significance of each ranking criterion and various approaches.

Table 2. Ranking results

Rank	Action	Phi	Phi+	Phi-
1	Serbia	0,2859	0,5314	0,2454
2	Montenegro	0,2576	0,5465	0,2889
3	Northern Macedonia	0,1395	0,4372	0,2976
4	B&H	-0,3070	0,2466	0,5536
5	Albania	-0,3760	0,2090	0,5850

Source: Authors' calculations.

It is required to look at the profiles of the observed countries created using Visual PROMETHEE software to assess the factors contributing to this rating. It is feasible to pinpoint each country's advantages and disadvantages using country profiles. The upward-pointing pillars stand for each country's advantages over the others. The larger the pillar, by the specified criteria, the greater the given country's advantage over others. On the other hand, the pillars that face down show disadvantages. The observed country's limitation increases with the pillar size given the criterion.

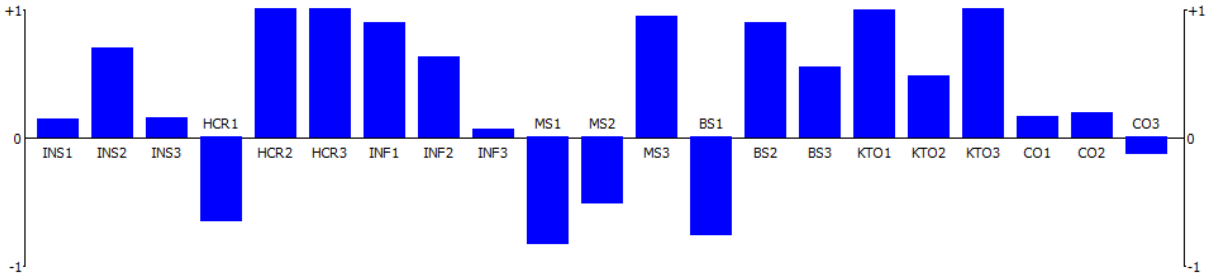


Figure 1. Serbia's Profile

Figure 1's profile of Serbia concludes that its success in securing the top position was largely due to its advantages in institutions, infrastructure, and technological and intellectual outputs. While the political and corporate environments are marginally more favorable than in other countries, the regulatory environment is the most pronounced advantage in institutions. ICT infrastructure development is the biggest advantage in infrastructure development, while environmental sustainability has a much smaller advantage. Serbia uses e-government more frequently and has more readily accessible state online services. Although the number of online services has significantly increased, their use is still only slightly above average (Đurašković et al., 2021).

In the creation and diffusion of knowledge, Serbia enjoys a substantial advantage. Compared to other WB countries, Serbia has a stronger diversification of production and exports, with the largest exports of ICT services as a percentage of total exports and the most scientific journal articles. Additionally, because of the bad conditions in education generally, Serbia's enormous advantage in human capital and research, attained via the development of higher education and R&D, has been significantly diminished. The longer average length of schooling and lower educational investment are the causes of this.

Business sophistication is a big advantage. It was made possible by relatively effective actor networking in knowledge absorption, hindered by employees' inadequate abilities and innovative development. Serbia also observed a certain advantage in creative outputs, which relates to the number of creative goods and services and the relatively high value of intangible

assets. Serbia's most important disadvantage is its relatively low market sophistication, resulting from unfavorable lending conditions and low investment activity (Sanfey et al., 2016).

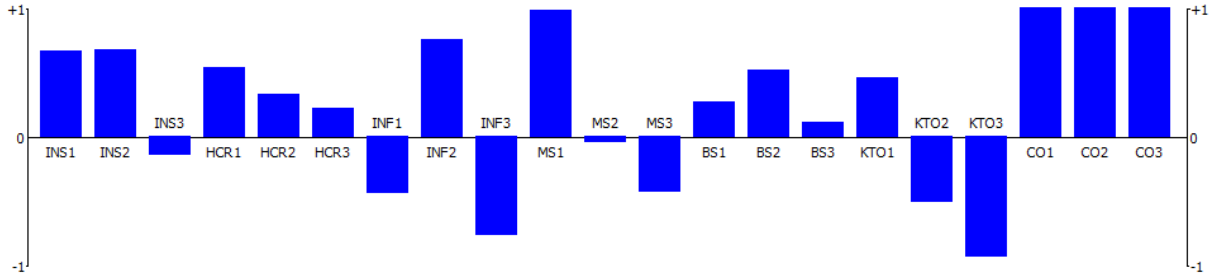


Figure 2. Montenegro's Profile

According to Figure 2, Montenegro has an important advantage over other WB countries regarding human capital and research, business sophistication, and creative outputs. This country has the largest human resources and research advantage in the general education development segment, followed by higher education development, and the least in the R&D field. Due mostly to the connections made by the good actors in the sphere of innovation development, a somewhat better position in terms of business sophistication compared to other countries was attained. Montenegro has a distinct advantage in the area of creative outputs, where it records the highest intangible asset value, the highest number of creative goods and services, and the highest level of online creativity (Milić, 2022).

The business and regulatory environments are advantageous in Montenegro. These positive outcomes are somewhat offset by the challenging business startup procedures and the most challenging and expensive insolvency resolution process. Most segments are disadvantaged compared to other countries regarding infrastructure, market sophistication, and knowledge and technology outputs.

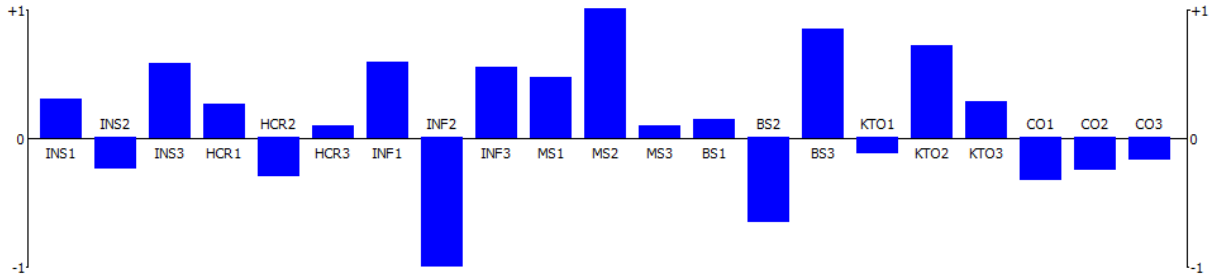


Figure 3. N. Macedonia's Profile

The only area in which N. Macedonia has a competitive advantage over other WB countries in all sectors, according to Figure 3, is market sophistication. This country offers the ideal circumstances for investment (Marjanović & Đukić, 2020). This country has a considerable advantage in institutions, human capital and research, infrastructure, business sophistication, and knowledge and technological outputs. This country enjoys a comparatively favorable political and business environment in terms of institutions. However, the country's regulatory environment is unfavourable because of the weak rule of law (Hoxhaj, 2021). In terms of general education development and R&D, this country performs relatively well compared to other WB countries in human capital and research. But the country's underdeveloped higher education system is one of its limitations (Stambolieva, 2018; Bigagli, 2021; Thanasi-Boçe & Kurtishi-Kastrati, 2022). Due to this situation in higher education and

the difficult socioeconomic climate, a large portion of the youthful population has migrated, decreasing the number of students.

Figure 3 demonstrates how this country's greatest weakness is its infrastructure's general underdevelopment, which negatively impacts the advancement of ICT infrastructure and environmental sustainability. This deficiency is the result of ineffective logistics and electricity production and delivery (Atoyan et al., 2018). This country has a strong knowledge absorption advantage and a marginal workers' skill advantage regarding business sophistication. The impact and, to a lesser extent, the knowledge diffusion are advantages in knowledge and technology outputs. The insufficient creation of knowledge is a minor limitation. This country still has significant gaps in the actors' networking in the sector of innovation development. This restriction results from inadequate collaboration between academic institutions and the economy (Petruhevska, 2019). The creative outputs had the worst outcomes.

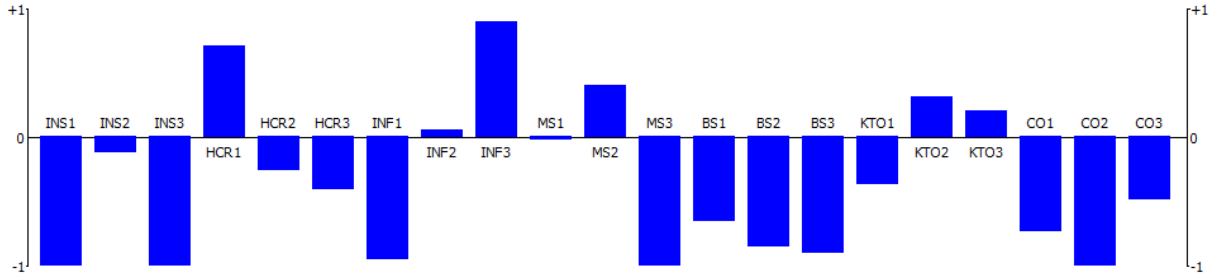


Figure 4. B&H's profile

Figure 4 indicates that B&H has several disadvantages. The institutions, business sophistication, and creative outputs are lacking compared to other WB countries. B&H's political and business environment is the worst in terms of institutions. This country is characterized by the absence of a favorable and predictable environment for businesses to participate in creative activities (Aridi & Ong Lopez, 2019). The regulatory environment, however, is somewhat less pronounced in this country. The level of business sophistication is a considerable barrier. There is a lack of actors networking involved in developing the innovations, followed by a lack of knowledge absorption. The lowest volume of creative goods and services, followed by a low intangible asset value and, finally, a lack of online creativity, are the worst drawbacks in terms of creative outputs.

The ICT infrastructure in this country is the least advanced. On the other hand, the country's greatest advantage is its commitment to environmental sustainability. The achievement of this goal has been made possible by working toward EU standards for ecological sustainability (Primorac, 2021). A relatively strong science impact and diffusion also give this country a modest lead over other WB countries in terms of infrastructure development generally, including knowledge and technology outputs.

In the end, it should be highlighted that this economy only has one advantage over other WB countries in two areas: market sophistication and human capital and research. It can be said that the capital market in this country is complex, organized, and multilayered when taking regulation and organization into account (Kasumović & Mešić, 2018). Due to the highest import and export tariffs in WB, the absence of a single economic space, and the existence of a divided internal market, this economy is in the worst position compared to other WB countries in terms of trade volume, size, and market diversification (Sinanagić et al., 2013).

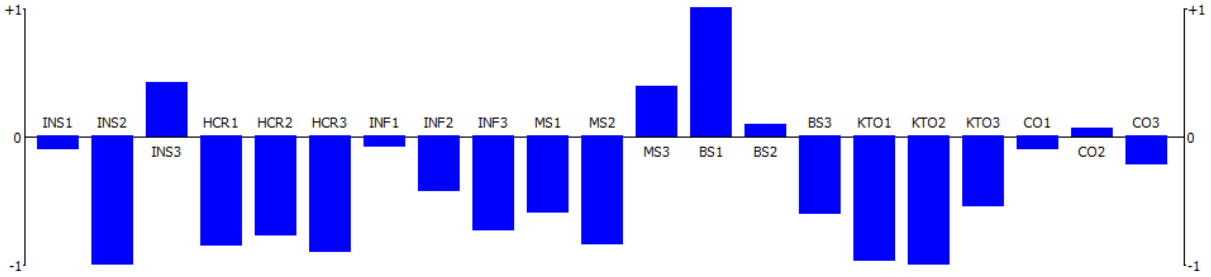


Figure 5. Albania's profile

Albania has various constraints, as seen in Figure 5, responsible for its poor performance in the final rankings. All of the examined components show the country's enormous limits in terms of infrastructure, human resources and research, and knowledge and technology output. The restriction of this economy is most obvious in the areas of human capital and research. Higher education and education, in general, are underdeveloped. There aren't many researchers, and R&D spending isn't very high (Sota, 2021a). The least obvious weakness is the underdevelopment of ICT infrastructure. The lack of infrastructure development in general and, in particular, the lack of adherence to the principles of environmental sustainability comes next.

A high amount of public debt restricts public infrastructure investments in this country, which has significant gross finance needs for infrastructure improvement. It also has an unstable energy supply, frequent outages, and significant distributional losses due to its outdated and low-capacity power plants. The infrastructure continues to be much below the EU average (Atoyan et al., 2018). The lowest creation and impact of knowledge are the most important limits in terms of knowledge and technological outputs.

Business sophistication is the only area where the Albanian economy has an advantage in two sections. Regarding the workers' qualifications and prospects for further training, it is in the top position (Sota, 2021b). This country's primary constraint is its capacity for knowledge absorption. Within the three areas under examination, Albania enjoys an advantage. In institutions, it is a business environment. There is trade volume, size, and market diversification in the market sophistication. However, only creative goods and services have a minor edge in creative outputs.

5. CONCLUSIONS

Economic growth and development in the WB countries are incredibly poor. The WB countries are less innovative than the EU member states. According to this study, Serbia is the top-ranked country in the WB region, followed by Montenegro, N. Macedonia, B&H, and Albania. The countries' profile diagrams also highlighted the main advantages and disadvantages of each of the observed countries.

Based on a conducted analysis, it is possible to establish specific recommendations for economic policymakers to raise the degree of innovation in these countries in the future. The WB's greatest potential lies in its human resources and still-respectable scientific results. Developing these potentials should be the primary goal of any initiatives designed to increase innovation and competitiveness. The greatest way to stop young people from leaving the WB is to strengthen the regional integration of academic institutions and industry. Institutions and infrastructure are essential "input" elements for the WB's innovation and competitiveness.

Improving the region's infrastructure and maintaining its political and institutional frameworks is important. Given the lack of funds for large infrastructure upgrades, these countries should prioritize investment projects to close the gap with countries in the EU progressively. Additionally, it is essential to boost competition in the infrastructure sector and privatize state-owned infrastructure businesses. The WB nations must increase R&D funding (particularly from the corporate sector), establish scientific research institutes that produce the knowledge required to build new technologies and improve collaboration among all R&D actors.

REFERENCES

Agasisti, T., & Bertoletti, A. (2022). Higher Education and Economic Growth: A Longitudinal Study of European Regions 2000–2017. Socio-Economic Planning Science, 81, 100940.

Agerberg, M. (2019). The course of knowledge? Education, Corruption and Politics. Political Behavior, 41, 369–399.

Aridi, A., & Ong Lopez, A. (2019). Towards a Private Sector led Growth Model: Bosnia and Herzegovina Innovation and Entrepreneurship Assessment. World Bank, Available at: https://elibrary.worldbank.org/doi/abs/10.1596/32024

Atoyan, R. V., Benedek, D., Cabezon, E., Cipollone, G., Miniane, J. A., Nguyen, N., Petri, M., Reinke, J., & Roaf, J. (2018). Public Infrastructure in the Western Balkans: Opportunities and Challenges. Departmental Papers, 2018(002), A001. Available at: https://www.elibrary.imf.org/view/journals/087/2018/002/article-A001-en.xml

Avelar, A. B. A., Da Silva-Oliveira, K. D., & Da Pereira, R. S. (2019). Education for Advancing the Implementation of the Sustainable Development Goals: A Systematic Approach. The International Journal of Management Education, 17, 100322–100331.

Aytekin, A., Ecer, F., Korucuk, S., & Karamaşa, Ç. (2022). Global innovation efficiency assessment of EU member and candidate countries via DEA-EATWIOS multi-criteria methodology. Technology in Society, 68, 101896.

Balkytė A., & Tvaronavičienė, M. (2010). Perception of competitiveness in the context of sustainable development: Facets of sustainable competitiveness. Journal of Business Economics and Management, 11(2), 341–365.

Baumann, J., & Kritikos, A. S. (2016). The Link Between R&D, Innovation and Productivity: Are Micro Firms Different? Research Policy, 45(6), 1263–1274.

Bigagli, F. (2021). Higher Education in Emergencies: The Case of Consociational North Macedonia. Journal of Curriculum Studies Research, 3(2), 1–18.

Brajković, L. (2016). Higher education in Western Balkans: Recent trends and challenges. International Higher Education, 87, 27–29.

Calabrò, A., Torchia, M., Jimenez, D. G., & Kraus, S. (2021). The role of human capital on family firm innovativeness: the strategic leadership role of family board members. International Entrepreneurship and Management Journal, 17(1), 261–287.

Coad, A., Segarra, A., & Teruel, M. (2016). Innovation and firm growth: Does firm age play a role? Research Policy, 45, 387–400.

Colombelli, A., Haned, N., & Le Bas, C. (2013). On firm growth and innovation: Some new empirical perspectives using French CIS (1992–2004). Structural Change and Economic Dynamics, 26, 14–26.

Cooray, A. V. (2009). The Role of Education in Economic Growth. Proceedings of the 2009 Australian Conference of Economists (pp. 1–27). Adelaide, Australia: South Australian Branch of the Economic Society of Australia.

Cvetanović, S., Despotović, D., Mladenović, I., & Jovović, D. (2014). The analysis of innovation in Western Balkan countries in 2012. Economic Research-Ekonomska Istraživanja, 27(1), 830–846.

Cvetanović, S., Kostić, A., & Šušić, V. (2020). Quantification of the interdependence of innovation ability and competitiveness of the Southeast European countries. Škola biznisa, 17(2), 85–106.

Despotović, D. Z., Cvetanović, S. Ž., & Nedić, V. M. (2014). Innovativeness and competitiveness of the Western Balkan countries and selected EU member states. Industrija, 42(1), 27–45.

Diaconu, L. (2011). The Role of Innovation for the Economic Growth and Development of the States. The Case of the Emerging Countries. ERSA conference papers ersa11p391, European Regional Science Association.

Docampo, D. (2013). Reproducibility of the Shanghai Academic Ranking of World Universities Results. Scientometrics, 94(2), 567–587.

Đurašković, J., Viduka, D. & Gajić-Glamočlija, M. (2021). The Use of E-government from the Perspective of Biggest Business Entities in Serbia. Journal of Information and Organizational Sciences, 45(1), 39–53.

Erić, O. (2018). Education and Economic Growth of the Western Balkans Countries. ECONOMICS-Innovative and Economic Research, 6(2), 27–35.

Hasan, I., & Tucci, C. (2010). The innovation–economic growth nexus: Global evidence. Research Policy, 39, 1264–1276.

Hoxhaj, A. (2021). The EU rule of law initiative towards the Western Balkans. Hague Journal on the Rule of Law, 13(1), 143–172.

Jagódka, M., & Snarska, M. (2021). The State of Human Capital and Innovativeness of Polish Voivodships in 2004–2018. Sustainability, 13(22), 12620.

Jardon, C. M. (2016). Human capital as source of innovativeness in subsistence small businesses. Journal of Technology Management & Innovation, 11(3), 59–66.

Jovanović, M. (2018). Innovation of Serbia in relation to neighboring countries as a determinant of competitiveness. Ekonomika 64(1), 65–78.

Jusić, M., & Obradović, N. (2019). Enlargement policy and social change in the Western Balkans. Friedrich Ebert Foundation, Sarajevo, Bosnia and Herzegovina. Available at: https://library.fes.de/pdf-files/bueros/sarajevo/15801-20191120.pdf

Kasumović, M., & Mešić, M. (2018). Macroprudential stability indicators of financial systems: Analysis of Bosnia and Herzegovina and Croatia. Theoretical & Applied Economics, 25(1), 41-54.

Kikoni, E. (2020). The Economic and Social Impact of COVID-19: Western Balkans Outlook, World Bank Group. Available at: https://policycommons.net/artifacts/1255940/the-economic-and-social-impact-of-covid-19/1822108/

Klisaroski, M. B. (2018). ICT in function of promoting innovation for realization of competitive advantage in the Republic of Macedonia. Ekonomski izazovi, 14, 68–79.

Kostoska, O., & Hristoski, I. (2017). ICTs and innovation for competitiveness: Evidence for Western Balkans vis-à-vis the European Union. Zbornik radova Ekonomskog fakulteta u Rijeci, časopis za ekonomsku teoriju i praksu – Proceedings of Rijeka Faculty of Economics, Journal of Economics and Business, 35(2), 487–518.

Lagumdžija, Z., Kapo, A., & Turulja, L. (2019). From competitiveness to sustainability: Is the innovativeness the answer? BH Ekonomski forum, 11(2), 25–38.

Lendel, I. (2010). The Impact of Research Universities on Regional Economies: The Concept of University Products. Economic Development Quarterly, 24(3), 210–230.

Li, H., & Tang, J. (2017). Technological human capital, firm innovativeness, and entrepreneurial success: the moderating role of seeking and receiving external funding. World Review of Entrepreneurship, Management and Sustainable Development, 13(1), 106–119.

Marjanović, D., & Đukić, M. (2020). Western Balkan countries as an attractive investment destination. Economic Analysis, 53(2), 109–120.

McCormick, M., & Fernhaber, S. A. (2017). Are growth expectations being met? Implications for the internationalization of micro-sized venture. Small Business Economics, 50(3), 591–605.

Milić, T. (2022). Education and Science in Montenegro as a Base for the General Development and Well-Being of the Society. In Science Education in Countries Along the Belt & Road (pp. 453–469). Springer, Singapore.

Paredes-Frigolett, H., Pyka, A., & Leoneti, A. B. (2021). On the performance and strategy of innovation systems: A multicriteria group decision analysis approach. Technology in Society, 67, 101632.

Petruhevska, T. (2019). Universities in the Republic of North Macedonia in the era of the European Union's ambitious plan for research and innovation. JUSTICIA–International Journal of Legal Sciences, 7(12), 172–181.

Pilav-Velić, A., & Marjanović, O. (2016). Integrating open innovation and business process innovation: Insights from a large-scale study on a transition economy. Information & Management, 53(3), 398–408.

Primorac, Ž. (2021). Technological, ecological and energy aspects of the development of Bosnia and Herzegovina. Science, Art & Religion, 1(1-2), 126–135.

Ramadani, V., Hisrich, R. D., Abazi-Alili, H., Dana, L. P., Panthi, L., & Abazi-Bexheti, L. (2019). Product innovation and firm performance in transition economies: A multi-stage estimation approach. Technological Forecasting and Social Change, 140, 271–280.

Rubera, G., D. Chandrasekaran, and A. Ordanini. 2016. “Open innovation, product portfolio innovativeness and firm performance: the dual role of new product development capabilities.” Journal of the Academy of Marketing Science 44 (2): 166-184.

Sanfey, P., Milatović, J., & Krešić, A. (2016). How the Western Balkans can catch up. European Bank for Reconstruction and Development. EBRD Working paper No. 186 Available at: https://www.ebrd.com/news/2016/how-the-western-balkans-can-catch-up.html

Savić, N., Pitić, G., & Lazarević, J. (2018). Innovation-driven economy and Serbia. Ekonomika preduzeća, 66(1-2), 139–150.

Schumpeter J. A. (1950). Capitalism, Socialism and Democracy. New York: Harper Bros.

Sinanagić, M., Čivić, B., & Kamarić, A. (2013). Driving mechanisms and determinants of foreign direct investment in Bosnia and Herzegovina. Transition: Journal of Economic & Politics of Transition, 15(31), 107–124.

Sota, J. (2021a). An Inclusive Education Policy Oriented to Profession is the Key to the Development of Albanian Economy (Historical Trends in Vocational School 2008-2018). Interdisciplinary Journal of Research and Development, 8(1), 20.

Sota, J. (2021b). Education and Labor Market in Albania and European Union: Achievements and Challenges. Interdisciplinary Journal of Research and Development, 8(1), 64.

Stambolieva, M. (2018). Higher Education Systems and Institutions, Macedonia. In: Teixeira P., Shin J. (eds) Encyclopedia of International Higher Education Systems and Institutions. Springer, Dordrecht.

Thanasi-Boçe, M., & Kurtishi-Kastrati, S. (2022). Social responsibility approach among universities' community. Journal of Enterprising Communities: People and Places in the Global Economy, 16(3), 384–401.

Trbovich, A. S., Vučković, A., & Drašković, B. (2020). Industry 4.0 as a lever for innovation: Review of Serbia's potential and research opportunities. Ekonomika preduzeća, 68(1-2), 105–120.

WIPO. (2021). Global Innovation Index 2021: Tracking Innovation through the COVID-19 Crisis. Geneva: World Intellectual Property Organization. Available at: https://www.wipo.int/publications/en/details.jsp?id=4560

World Bank. (2019). Migration and Brain Drain: Europe and Central Asia Economic Update (Fall). Washington, DC: World Bank.

Zhu, D., Zeng, D., & Zhou, Q. (2011). Regional technical innovation suitability and economic growth in China. Procedia Engineering, 15, 5343–5349.

Živković, Ž., Arsić, M., & Nikolić, Dj. (2017). The University of Belgrade on ARWU List Part I: The impact of Individual Faculties on the Achieved Position Using PROMETHEE – GAIA Method. Serbian Journal of Management, 12(2), 171–187.

Volume XIX, Issue (1) (2023) 605-614

International May Conference on Strategic Management

ASSESSING WASTE STREAMS IN RELATION TO RECYCLING PERFORMANCE IN AN ACADEMIC ENVIRONMENT

Nkhumiseni Nancy Mavhungu[1*], Machete Machete[1], Mulatu Fedaku Zerihun[2], Philix Mnisi[1]

[1]Department of Environmental Science, University of South Africa, South Africa
[2]Department of Economics and Finance, Tshwane University of Technology, South Africa

Abstract: Interdependency exists between waste streams and universities' recycling performance. The relationship between the university's waste streams and recycling performance was assessed. The generated amount of solid waste stream is not always preventable considering the population and nature of activities. Universities are good examples of institutions where people either go to work or study regularly. Thus, this study aimed to assess the procurement policy provisions on recycling matters within the university. The data was collected from participants who were randomly selected. Questionnaires were distributed to sampled participants, where responses were received, and a mixed-approach study design was used. Data analysis followed explanatory, exploratory, and descriptive approach. The study results showed that the university's recycling focused mainly on paper and that most participants were not informed about the amount of waste generated, reused, recycled and disposed of. Thus, the study recommends implementing awareness programmes on waste management to enhance recycling performance.

Keywords: University, Waste stream, Recycling performance, Landfill, Participants.

1. INTRODUCTION

There is likely a relationship between waste streams and recycling performance within universities. This study has evaluated the university's waste streams regarding recycling performance. According to (Bahçelioğlu et al., 2020), the amount of solid waste generated from various streams is not always preventable for large campuses considering the high population and nature of activities. In addition, Universities are a good example of institutions where many people either go to work or study daily (Bahçelioğlu et al.,2020). Meanwhile, (Gallardo et al., 2016) argued that most waste is generated from cafeterias, canteens, and at photocopying machines. However, waste reduction strategies include waste prevention, reducing generated waste through recovery, reuse of potential waste materials and recycling recyclable materials (Ugwu et al., 2021). Furthermore, composting organic wastes, and energy recovery from waste are other waste solutions, and the waste that remains after all these processes are properly disposed of (Ugwu et al., 2021). Thus, the value of waste recovery and recycling offers a substantial economic benefit (Yong et al., 2019).

The waste stream factors that influence or facilitate recycling performance within universities. The more waste streams are segregated, the higher the opportunity to recycle more waste volume (Shooshtarian et al., 2022). Knickmeyer (2020) found that participation in

[*] *Corresponding author: mnkhumiseni@gmail.com*

presorting common waste streams assisted in decreasing contamination that affects batches of recycled material. Meanwhile, Wang et al. (2020) mentioned that efficient recycling performance depends on the awareness that educates people to know why, what, and how to recycle waste. Similarly, Debrah et al. (2021) found that environmental sustainability education should be included in educational institutions at all levels within developing countries. In addition, Roscoe et al. (2019) indicated that environmental training programme increases employees' skills while enhancing emotional involvement. Furthermore, Suttibak and Nitivattananon (2008) found economic and financial institutions as well as technical aspects to be among the factors influencing recycling performance. Therefore, waste stream factors that influence universities' recycling performance must be identified and mitigated to improve recycling performance. The literature review in the next section(s) outlines these waste stream factors in detail.

2. LITERATURE REVIEW

According to Painter et al. (2016), universities generate about 540 million tonnes of food waste globally on an annual basis. It is also estimated that each Rhodes University student generates around 555g of food waste (Painter et al., 2016). Meanwhile, Jamro et al. (2022) estimated that the University of British Columbia in Canada generates around 2834 solid waste tons annually. In addition, a study in Mexico found that the Universidad Autonoma Metropolitana community generated a weekly average of 7.74 tons of solid waste, which includes 1.72 tons of garden waste, equivalent to 0.110kg/day/person within the campus (Espinosa et al., 2008). The waste report from Malaya University in Malaysia includes organic food waste (33%), mixed papers (14%), plastic bags (10%), and other plastics (10%) (Owojori et al., 2020). Furthermore, Akoka Campus of the University of Lagos in Nigeria revealed that waste generation at the campus is 32.7 tonnes per day, of which 39% was plastic waste, 15% organic waste, 15% paper, 8% soil and stone, 7% was a sanitary waste, and 75% of waste was recyclable (Zhang et al., 2020). Dahlawi and Sharkawy (2021) found that, most solid waste was generated daily from different sources within the university's offices, classrooms, laboratories, restaurants, residence halls and other facilities. Moreover, Dahlawi and Sharkawy (2021), concluded that solid waste consisted of various waste types such as paper, plastic, textiles, metals, glass, food residues (organic), and metal cans (inorganic). The South African Environmental affairs state of Waste (2018) reported that the predictable 108 million tonnes of waste were generated, of which about 59 million tonnes were general waste, and 48 million tonnes were an unclassified waste. Thus, all these wastes generated on regular bases create adverse environmental impacts in society.

At Moi University in Kenya, results showed that the largest amount (62%) of food waste was recyclables (Dahlawi & Sharkawy, 2021). Meanwhile, Espinosa et al. (2008) indicated that the Universidad Autónoma Metropolitana recycled 2.2 tons of glass bottles, 2.3 tons of polyethene terephthalate (PET) bottles, 1.2 tons of Tetrapak packages, and 27.5kg of aluminium cans. In addition, De Vega et al. (2008) reported that Brown University in the United States of America recycled 31% of its waste, while Colorado State University and the University of Florida recycled 53% of waste. Furthermore, in the South African market in 2011 66,000 tonnes were recovered and recycled about 28% of metals (Friedrich & Trois, 2013). The Glass Recycling Company succeeded on increasing the glass recycling rate from 18% in 2005/2006 to 32% in 2009/2010 (Friedrich & Trois, 2013). Moreover, (Matete & Trois, 2008) found South Africa to be having an effective recycling industry. Consequently, (Friedrich & Trois, 2013) reported that almost 4840 permanent formal jobs and about 34500 informal jobs (waste pickers) were created through the plastic recycling industry in 2009.

According to Di Maria and El-Hoz (2020) landfill has a significant role to play in waste management. Kaseva and Gupta (1996) found that in Tanzania the materials that are not being recycled amounted to 290 tonnes/day which are finally disposed at landfills. Meanwhile, in South Africa, 59 million tonnes (90%) of general waste generated ended up in landfills (Department of Environmental Affairs, 2012). In addition, Di Maria and El-Hoz (2020) reported a large amount of municipal solid waste (MSW) (35%) of waste that should be exemplified by not recoverable, recyclable, and reusable materials. Di Maria and El-Hoz (2020) shows that about 246,000,000 tonnes of waste per year were generated in European, while about 60,000,000 tonnes of waste went directly to the landfills without any attempt for recovery or recycling operations. Meanwhile, in a Mexican university of Mexico by practising a waste segregation program in 2003, the institution reduced the waste quantity disposed of at landfills by 67%, which also resulted in great savings for the institution (De Vega et al., 2008). Consequently, De Vega et al. (2008) show that the university ended up disposing of 33% of waste after the waste segregation program. Furthermore, in Malaysia, Zailani et al. (2012) found that when procuring materials through an industrial supply chain, the associated packaging waste is often ignored, and the by-product that is poorly managed results in litter, poor recycling and unnecessary waste disposed of in landfills. Through supply chain management interventions reusable and recyclable solid waste recognition is a matter of enhancing economic and social value, creating employment and income, and promoting citizenship (Zailani et al., 2012). Clearly, landfills should be the last resort for a few inert residual wastes (Hadjibiros et al., 2011). Thus, Snyman and Vorster (2011) indicated that when no reduction is achieved in the Tshwane municipality, then the number of recyclables destined for landfilling will reach 1 144 000 tonnes in 2022.

3. MATERIALS AND METHODS

3.1. Description of the study area

The study was conducted at the Tshwane University of Technology (TUT). TUT has incorporated the former Technikon Northern Gauteng, Technikon North West and Pretoria Technikon. TUT has campuses in Pretoria, Acardia, Arts, Ga-Rankuwa, Polokwane, eMalahleni, Mbombela, Soshanguve South and Soshanguve North campus. Figure 1 shows the provincial footprint of the study area that covers Gauteng Province, Mpumalanga, and Limpopo as well as North West Province, all within the Republic of South Africa.

3.2. Population and sampling techniques

The study has purposefully selected the Department of Procurement and Landscaping as the study population. Purposeful sampling lies in choosing information for the study and learning a great deal about issues of central importance to the purpose of the inquiry, thus the term purposeful sampling (Suri, (2011). In line with (Awizie & Emuze, 2016) who purposefully and conveniently sampled forty-three high education institutions across two different countries in Sub-Sahara Africa- Nigeria and South Africa. Meanwhile, (Keller, 2014) states that it's important to select a proportion of the population to represent the whole population. The number of employees within these departments is 233 (TUT model developer and reporting strategic management support, 2022). Thus, the study population is N = 233.

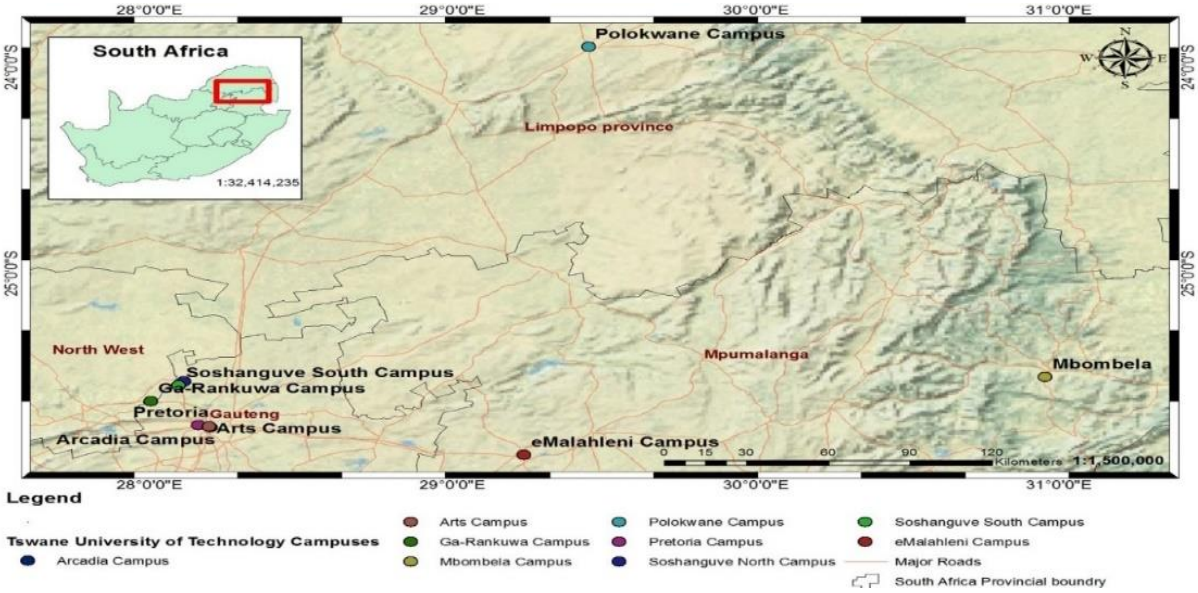


Figure 1. The provincial footprint for the Tshwane University of Technology

To determine the sample size, Yamane's (1967) formula was used:

$$n = \frac{N}{1 + N(e)^2} \quad (1)$$

In this study, the sample size(n) was determined at a population confidence level of 95%, with an error margin of ±5%, where N is the population size and e is the level of precision which is equal to 0.05 (Yamane,1967). The following calculation shows how the sample size was calculated using (Yamane's, 1967) formula.

$$n = \frac{233}{1 + 233(0.05)^2}$$

$$= \underline{143} \quad (2)$$

3.3. Research designs

3.3.1 Data Collection

The data was collected from May to July 2022. The participants were randomly selected, and a snowball sampling technique was followed. Then a Microsoft questionnaire was sent via email, and WhatsApp and hard copies were distributed to those who do not have access to computers or smartphones. The responses received were 81 (56.6%). The participants were informed of the purpose of the study and requested to sign a consent form. Every participant completed the questionnaires in writing as all could read and write. According to (Kasinja & Tilley, 2018) structured questionnaires may be administered to participants for data collection.

3.3.2 Data analysis

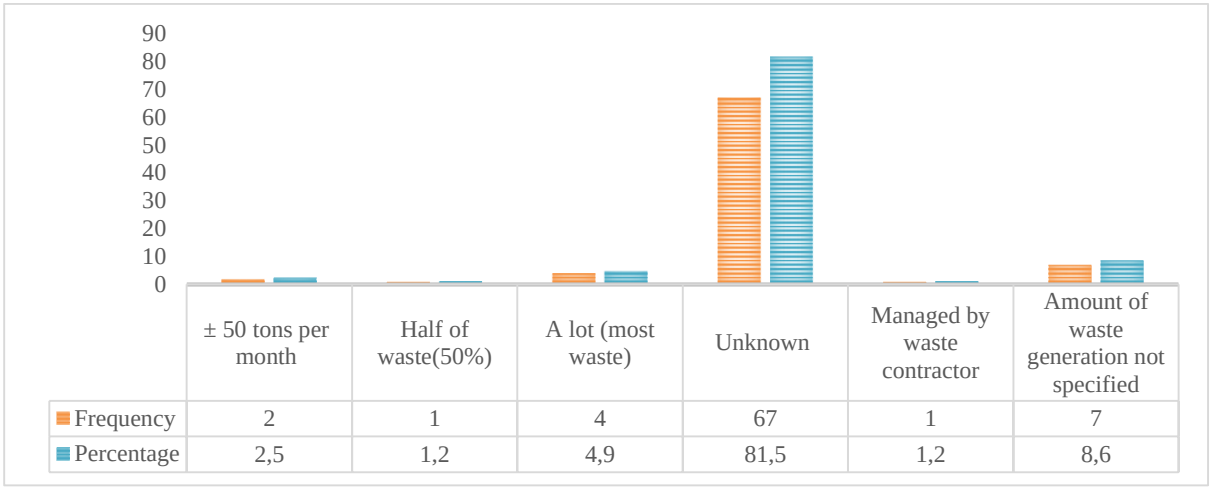
Data analysis is the process of collecting, modelling and analysing data to extract insights that support decision-making cited by (Phiri, 2021). The researcher adopted data analysis steps. Data analysis includes explanatory, exploratory, descriptive, correlation, and statistics, including probability statistics (Mouton 2013; William & Mohamed, 2012). A mixed-method approach was adopted in this study, as defined by (Creswell et al., 2009) and (Leedy & Paul, 2010). The approach was completely mixed in the use of research designs (survey and observations), and the type of data that was collected consisted of qualitative and quantitative variables. These are the following: data reduction, data display and conclusion drawing. After data collection, the data was coded and summarized to make it manageable.

4. RESULTS AND DISCUSSION

4.1. The University's waste streams and recycling performance.

4.1.1 How much waste is generated within the university per month?

The study results in figure 2 show that, from the total population of 81(100%) participants, 61 respondents (81.5%) did not know the amount of waste being generated within the university. Meanwhile, 7 (8.6%) respondents indicated that the amount of waste generated was not specified, another 4 (4.9%) reported that there was a lot of waste being generated per month, and 2 respondents (2.5%) indicated that about 50 tons of waste were generated per month (figure 2). In addition, 1 respondent (1.2%) mentioned that 50% of waste was being generated (seemingly, the respondent might have misunderstood the question) and another respondent (1.2%) outlined that waste is managed by contractors (also misunderstood the question) (figure 2). Therefore, the results outline that most respondents 61(81.5%) were not aware of the amount of waste generated.



	± 50 tons per month	Half of waste(50%)	A lot (most waste)	Unknown	Managed by waste contractor	Amount of waste generation not specified
Frequency	2	1	4	67	1	7
Percentage	2,5	1,2	4,9	81,5	1,2	8,6

Figure 2. Shows the amount of waste generated within the university per month

4.1.2 How much waste is being recycled and or reused within the university?

The study results in Table 1, show that from the total population of 81(100%) participants, 67 respondents (81.5%) did not know how much waste was being recycled and or reused within the university. Another 8 respondents (9.8%) indicated that waste recycling quantities were not

specified (table 1). Meanwhile, 3 respondents (3.7%) indicated that an estimation of 10-25% of waste was recycled (table 1). In addition, 1 respondent (1.2%) stated that about 40% of waste was recycled (table 1). Moreover, 1 respondent (1.2%) indicated that recycling was done by contractors. In the contrary, 1 respondent (1.2%) reported that there was no recycling within the university. Thus, the majority 67 (81.5%) did not know how much waste was being recycled and or reused within the university.

Table 1. The amount of waste being recycled or re-used within the university

Feedback	**Frequency**	**Percentage**
About 10 - 25% of waste	3	3.7%
About 40% of waste	1	1.2%
Unknown	67	81.5%
Managed by the waste contractor	1	1.2%
Waste recycling data not specified	8	9.8%
No recycling	1	1.2%
Total	**81**	**100%**

4.1.3 The most common recyclable items at the university

The results in Table 2 present the most common recyclable items at the university, from the total population of 81(100%) participants, 28 respondents (34.6%) mentioned paper as the most common recyclable material. Meanwhile, 21 respondents (25.9%) reported plastic as the most common recyclable (table 2). In addition, 6 respondents (7.4%) listed bottles as the most common recyclables (table 2). Moreover, twelve (12) respondents (14.8%) did not know about the recyclables within the university (table 2). Thus, the majority of 28 respondents (34.6%) mentioned paper as the most common recyclable waste at the university.

Table 2. The types of recyclable items identified within the university

Feedback	**Frequency**	**Percentage**
Plastic	21	25.9%
Paper	28	34.6%
Cardboard boxes	5	6.2%
Tins/Cans	5	6.2%
Office equipment	1	1.2%
Glass	2	2.5%
Garden Waste	1	1.2%
Bottles	6	7.4%
Unknown	12	14.8%
Total	**81**	**100%**

4.1.4 The reasons recycling focuses on certain recyclables

The results in table 3 present the reasons why recycling focuses on certain recyclables, from the total population of 81(100%) participants, 49 respondents (60.4%) did not know why recycling at Tshwane University of Technology (TUT) only focused on certain recyclables.

Meanwhile, 10 respondents (12.3%) indicated that the recyclables in table 2 were the most common recyclables within the waste streams. In addition, nine (9) respondents (11.1%) mentioned that the university focused on recycling certain recyclables as they are easy to recycle, this includes other reasons as shown in table 3. In the contrary, ten (10) respondents (12.3%) reported that there was no recycling within the university. Thus, the majority of 49 participants (60.4%) were not aware as to why the recycling only focused on those recyclables shown in Table 3.

Table 3. The reasons for recycling particular recyclables

Feedback	**Frequency**	**Percentage**
Easy to recycle	9	11.1%
Common recyclables in the waste stream	10	12.3%
Good for environment	1	1.3%
Monetary reward/ value	2	2.6%
Unknown	49	60.4%
No recycling	10	12.3%
Total	**81**	**100%**

4.1.5 The waste quantities that are finally disposed of in the landfill after some waste is recycled

The results in Figure 3 represent the waste quantities that are finally disposed of in the landfill after some waste is recycled. The total population of 81(100%) participants, 77 respondents (95.0%) were not aware of the total amount of waste being disposed of in the landfill when some waste has been recycled. Meanwhile, 2 respondents (2.5%) mentioned that about 75% of the waste ended up in a landfill site, meaning 25% was recycled at TUT. In concurrence, another respondent (1.2%) indicated that a lot of waste was disposed of in a landfill. However, there is a respondent who appeared to be an outlier by indicating that 30% of waste was disposed of. Most respondents (95.0%) were not aware of the total estimated amount of waste being disposed of in the landfill after some waste has been recycled.

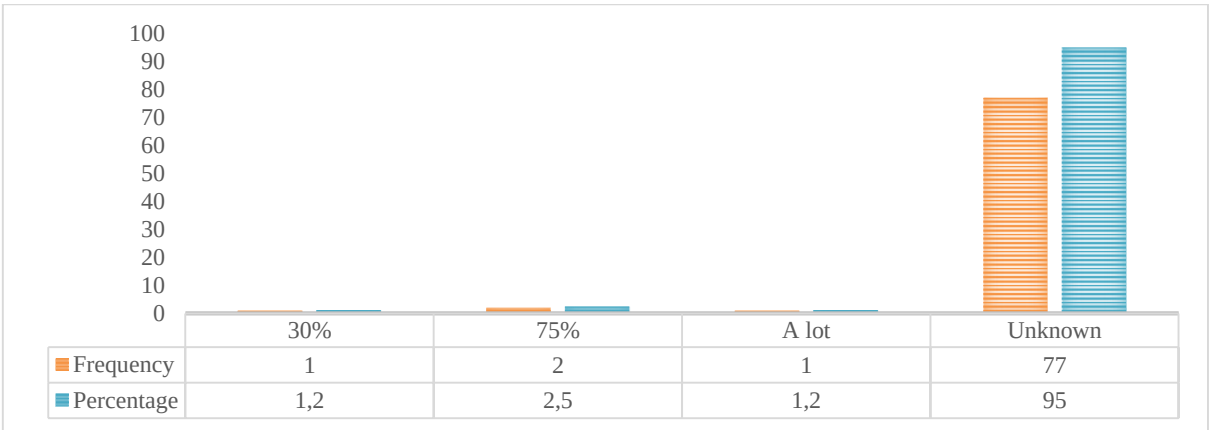


Figure 3. The amount of waste finally being disposed of in the landfill.

5. CONCLUSION

The purpose of the study was to evaluate the university's waste streams regarding recycling performance. The literature found that factors influencing university waste recycling performance should be identified and mitigated to improve recycling performance. (Dahlawi & Sharkawy, 2021) found that the waste generated creates negative impacts on the environment, economy, and society. Meanwhile, (Yong *et al*., 2019) found the value of waste recovery and recycling to be a substantial economic benefit. In concurrence, (Friedrich & Trois, 2013) discovered that almost 4840 permanent formal jobs and around 34 500 informal jobs (waste pickers) have been created by the plastic recycling industry in 2009. In addition, (Snyman & Vorster, 2011) indicated that when no reduction is achieved in the Tshwane municipality, then the number of recyclables destined for landfilling will reach 1 144 000 tonnes in 2022. (Hadjibiros et al., 2011) concluded that landfills become the last resort method for a few inert residual waste. The study results show that the majority of 61 respondents (81.5%) were not aware of the estimated amount of waste generated within the Tshwane University of Technology (TUT). The results also indicated that 67 respondents (83.0%) did not know how much waste was being recycled and or reused within the university. In addition, the study found that the highest number of 28 respondents (34.6%) mentioned papers as the most common recyclable waste at the university. Meanwhile, the study results also found that 49 respondents (60.4%) were not aware as to why the recycling only focused on certain recyclables such as paper, plastic, bottles, cardboard etc. Moreover, the results showed that many respondents (95.0%) were not aware of the total estimated amount of waste being disposed of in the landfill after some waste has been recycled. The study showed that the university's recycling focused mainly on paper and that most participants were not informed about the amount of waste generated, reused, recycled, and disposed of. Thus, the study recommends implementing awareness programmes on waste management to enhance recycling performance.

REFERENCES

Awizie, B., & Emuze, F. (2016). Enabling sustainable procurement of built assets in African universities: perspectives of facilities' directors. Journal of Construction Project Management and Innovation, 6 (sup-1), 1548-1562.

Bahçelioğlu, E., Buğdaycı, E. S., Doğan, N. B., Şimşek, N., Kaya, S. Ö., & Alp, E. (2020). Integrated solid waste management strategy of a large campus: A comprehensive study on METU campus, Turkey. Journal of Cleaner Production, *265*, 121715.

Creswell, J.W. (2009). Research design: qualitative, quantitative, and mixed methods approach. 3rd ed. Thousand Oaks, California.

Dahlawi, S., & El Sharkawy, M. F. (2021). Assessment of solid waste management practice in the university campus. International Journal of Sustainability in Higher Education, 22, 561-575.

Debrah, J. K., Vidal, D. G., & Dinis, M. A. P. (2021). Raising awareness on solid waste management through formal education for sustainability: A developing countries evidence review. Recycling, 6(1), 6.

Department of Environmental Affairs. (2018). South Africa's state of waste. A report on the state of the environment first draft report. Department of Environmental Affairs Pretoria.

De Vega, C. A., Benítez, S. O., & Barreto, M. E. R. (2008). Solid waste characterization and recycling potential for a university campus. Waste management, 28, S21-S26.

Di Maria, F., & El-Hoz, M. (2020). Management of the biodegradable fraction of residual waste by bioreactor landfill. Waste Management & Research, 38(10), 1153-1160.

Espinosa, R. M., Turpin, S., Polanco, G., De laTorre, A., Delfín, I., & Raygoza, I. (2008). Integral urban solid waste management program in a Mexican university. Waste management, 28, S27-S32.

Friedrich, E., & Trois, C. (2013). GHG emission factors developed for the recycling and composting of municipal waste in South African municipalities. Waste management, 33(11), 2520-2531.

Gallardo, A., Edo-Alcón, N., Carlos, M., & Renau, M. (2016). The determination of waste generation and composition is an essential tool to improve the waste management plan of a university. Waste management, 53, 3-11.

Hadjibiros, K., Dermatas, D., & Laspidou, C. S. (2011). Municipal solid waste management and landfill site selection in Greece: irrationality versus efficiency. Global NEST Journal, 13(2), 150-161.

Jamro, I. A., Chen, G., Mangi, S. A., Ma, W., & Allehyani, S. (2022). Management of university solid waste in China through gasification technology: An analysis of waste composition and energy potential. Environmental Science and Pollution Research, 1-15.

Kaseva, M. E., & Gupta, S. K. (1996). Recycling—an environmentally friendly and income-generating activity towards sustainable solid waste management. Case study—Dar es Salaam City, Tanzania. Resources, conservation and recycling, 17(4), 299-309.

Kasinja, C., & Tilley E. (2018). Formalization of informal waste pickers' cooperatives in Blantyre, Malawi: A feasibility assessment. Sustainability, 10, 1149.

Keller, G. (2014) Statistics for Management and Economics (Eds.), Inference about comparing two populations (pp. 427-479). Canada: Cengage learning.

Knickmeyer, D. (2020). Social factors influencing household waste separation: A literature review on good practices to improve the recycling performance of urban areas. Journal of cleaner production, 245, 118605.

Mouton, J. (2013). How to succeed in your masters and doctoral studies: A South African guideline and resource book: Cape Town. Van Schaik publisher.

Owojori, O., Edokpayi, J. N., Mulaudzi, R., & Odiyo, J. O. (2020). Characterisation, recovery, and recycling potential of solid waste in a university of a developing economy. Sustainability, *12*(12), 5111.

Painter, K., Thondhlana, G., & Kua, H. W. (2016*).* Food waste generation and potential interventions at Rhodes University, South Africa. Waste Management, *56*, 491-497.

Paul, D., & Leedy, O. J. E. (2010). Practical research: Planning and design. Pearson Educational International.

Phiri, B. (2021). The Role of Mass Media as a Tool for Public Enlightenment in Achieving the Sustainable Development Goals in Lusaka [Doctoral dissertation, Cavendish University].

Roscoe, S., Subramanian, N., Jabbour, C. J., & Chong, T. (2019). Green human resource management and the enablers of green organisational culture: Enhancing a firm's environmental performance for sustainable development. Business Strategy and the Environment, 28(5), 737-749.

Shooshtarian, S., Caldera, S., Maqsood, T., Ryley, T., Wong, P. S., & Zaman, A. (2022). Analysis of factors influencing the creation and stimulation of the Australian market for recycled construction and demolition waste products. Sustainable Production and Consumption, 34, 163-176.

Snyman, J., & Vorster, K. (2011). Towards zero waste: a case study in the City of Tshwane. Waste Management & Research, 29(5), 512-520.

Suttibak, S., & Nitivattananon, V. (2008). Assessment of factors influencing the performance of solid waste recycling programs. Resources, Conservation and Recycling, 53(1-2), 45-56.

Suri, H. (2011). Purposeful sampling in qualitative research synthesis. Qualitative research journal, 11(2), 63-75.

Ugwu, C. O., Ozoegwu, C. G., Ozor, P. A., Agwu, N., & Mbohwa, C. (2021). Waste reduction and utilization strategies to improve municipal solid waste management on Nigerian campuses. Fuel Communications, 9, 100025.

Wang, H., Liu, X., Wang, N., Zhang, K., Wang, F., Zhang, S., & Matsushita, M. (2020). Key factors influencing public awareness of household solid waste recycling in urban areas of China: A case study. Resources, Conservation and Recycling, 158, 104813.

William, F., & Mohamed, S.B (2012). A guide to managing research. Cape Town: Juta and CO Ltd.

Yamane T. (1967). Statistics: An introductory analysis. (2nd ed.). New York: Harper and Row.

Yong, Y. S., Lim, Y. A., & Ilankoon, I. M. S. K. (2019). An analysis of electronic waste management strategies and recycling operations in Malaysia: Challenges and future prospects. Journal of Cleaner Production, 224, 151-166.

Zailani, S., Jeyaraman, K., Vengadasan, G., & Premkumar, R. (2012). Sustainable supply chain management (SSCM) in Malaysia: A survey. International journal of production economics, *140*(1), 330-340.

Zhang, D., Hao, M., Chen, S., & Morse, S. (2020). Solid waste characterization and recycling potential for a university campus in China. Sustainability, 12(8), 3086.

Volume XIX, Issue (1) (2023) 615-623

International May Conference on Strategic Management

ANALYSIS OF THE PROJECT-BASED ORGANIZATIONS' CHARACTERISTICS INFLUENCE ON PROJECT MANAGEMENT PERFORMANCE

Nenad Milijić*, Ivan Jovanović, Aleksandra Radić

University of Belgrade, Technical Faculty in Bor, Engineering Management Department, 12 Vojske Jugoslavije, 19210 Bor, Serbia

Abstract: This paper presents the empirical results of the analysis of the project-based organizations' characteristics influence on project management performance, that is, on the effectiveness of project goals achieving. As a basis, it was used a multidimensional approach to project success assessment, through project management performance analysis, which emphasizes meeting the expectations of all stakeholders. The broader approach was chosen as a more comprehensive way of solving problems in the project environment in the current crisis and changing circumstances.
The research was conducted in 11 project-based organizations operating in various industrial sectors on the territory of the Republic of Serbia. A total of 253 employees were surveyed (project managers, production workers, and workers indirectly related to production). Statistical analysis of collected data was performed using the SPSS 18.0 software package. The mentioned impact was tested using the Multivariate analysis of variance (MANOVA) and it was found that project-based organizations' characteristics have a significant influence on project management performance.

Keywords: Project-based organizations, project management performance, analysis

1. INTRODUCTION

Project-based organizations in certain cases do not implement their projects adequately. Projects are not implemented within the expected time frame and the planned costs are exceeded. On the other hand, some projects are implemented successfully, achieving and even exceeding all expectations (time and budget). In such circumstances, it can be considered as successful project management that created satisfactory project performance and thus contributed to the success of the project. Therefore, it can be said that the core of project success is not only project performance, but primarily project management performance (Bryde, 2008; Mir & Pinnington, 2014; Delise et al., 2023). Project management performance refers to the efficiency of the project management process, as well as to all the procedures and decisions that are made throughout the entire project life cycle, which contribute to the success of the project. Therefore, when creating adequate procedures and making correct decisions, project managers often use learning and previous similar project experiences as a method, considering the achieved performance (Ika et al., 2022).

* *Corresponding author: nmilijic@tfbor.bg.ac.rs*

Project management performance can also be viewed as a project implementation control system. Project management performance monitoring is actually a feedback loop in the process of controlling the organization, direction and consumption of resources on the project (Bourne et al., 2018). However, the success of projects should not be viewed unilaterally. Project success is actually multidimensional, as different stakeholders view and measure project success in different ways (Lim & Mohamed, 1999). This multidimensionality of project success also represents a broadening of the focus of project performance on project management performance. This view of project management and evaluation of project success is incorporated in the PMPA model (*Project Management Performance Assessment*) (Bryde, 2003). This model proposes six criteria for evaluating project management performance based on the EFQM business excellence model: 1. leadership, 2. personnel, 3. project management policy and strategy, 4. partnerships, 5. project life cycle and 6. key performance indicators.

All of the above leads to the appearance of certain new problems related to this holistic approach. It is about the difficulties in the performance measurement process, because all stakeholders do not have equal views, and it is necessary to incorporate them into the whole (Jiang et al., 2009; Mir & Pinnington, 2014). In addition, projects differ in their uniqueness, their specificities, size and other indicators, and therefore performance and success evaluation criteria may differ between projects (Müller & Turner, 2007). Also, in different industries there are different perceptions of performance, and also the demographic characteristics of the personnel engaged on the projects affect the mentioned perception (Chan & Chan, 2004; Muller & Jugdev, 2012). Hence, the question of the universality of this model arises. However, this model has been confirmed and generally accepted in the literature (Quereshi et al., 2009; Mir & Pinnington, 2014).

1.1. Aim and scope of research

The previously stated facts leave certain doubts and raise certain questions. This was the motivation for the research, which aim was to analyse the project-based organizations' characteristics influence on project management performance. Therefore, the subject of research was various project organizations that realize projects in various industrial sectors.

2. RESEARCH METHODOLOGY

2.1. Questionnaire

As part of the conducted research, a questionnaire methodology for data collection was applied. During previous research (Milijić et al., 2020a; 2020b), the questionnaire was developed by modifying the original questionnaire, created by Quereshi et al. (2009), which is based on the PMPA model (Bryde, 2003). The questionnaire consists of two parts. The first part contains 9 control questions, 4 of which are of an organizational nature and are of particular importance for this research. (Number of employees, Years of existence, Ownership structure, and Type of project). The second part of the questionnaire is consisting of 41 questions, divided into 7 groups that describe project management performance.

2.2. Sample and data collection

Data collection was conducted by anonymous surveying of employees in 11 project-based organizations in the Republic of Serbia, whose activity is the implementation of various types of projects (Table 1). A total of 290 employees were surveyed, of which 253 correctly

completed questionnaires were collected, which represents 87.2%. A five-point Likert scale with values from 1 to 5 was used to evaluate respondents' answers, where 1 indicating the least and 5 the greatest importance.

From total of 253 respondents, 191 men and 62 women participated in the research. From total of number of employees who filled the questionnaire, there were 57 managers, 172 workers directly engaged in projects, as well as 24 workers indirectly related to the projects. As the goal of the research was to analyse the influence of project-based organizations' characteristics (Number of employees, Years of existence, Ownership structure, and Type of project) on project management performance, more detailed information on the organizational characteristics of the companies are shown in Table 1.

Table 1. Demographic and organizational characteristics of the study sample

Variables	Category	N	Percentage %
Gender	Male	191	75.5
	Female	62	24.5
Age	Less than 25 years	26	10.3
	26 – 35 years	69	27.3
	36 – 45 years	77	30.4
	46 – 55 years	55	21.7
	Above 56 years	26	10.3
Years of work experience	Less than 5 years	58	22.9
	6 – 10 years	84	33.2
	11 – 20 years	65	25.7
	21 – 30 years	26	10.3
	Above 31 years	20	7.9
Educational level	Elementary school	5	2.0
	High school	169	66.8
	Higher education	22	8.7
	University	54	21.3
	Doctoral degree	3	1.2
Project position	Manager	57	22.5
	Production workers on the project	172	68.0
	Workers indirectly related to the project	24	9.5
No. of employees	Less than 10 employees	8	3.2
	11 – 50 employees	158	62.5
	51 – 250 employees	70	27.7
	Above 251 employees	17	6.7
Years of existence	Less than 6 years	10	4.0
	6 – 10 years	44	17.4
	11 – 20 years	56	22.1
	21 – 30 years	70	27.7
	Above 31 years	73	28.9
Ownership structure	Domestic ownership	142	56.1
	Foreign ownership	74	29.2
	Mixed ownership	37	14.6
Type of project	Event organizing projects	41	16.2
	IT projects	43	17.0
	Industrial projects	47	18.6
	Construction projects	122	48.2

3. RESEARCH RESULTS

Based on the collected and arranged data, an initial database was formed. The data set from the database was further analysed with statistical tools using the SPSS 18.0 software package.

3.1. Descriptive statistics

As an initial step in data analysis, descriptive statistics of the examined sample were performed. Table 2 shows standard statistical parameters: sample size, range, mean, standard deviation and variance.

Table 2. Descriptive statistics

Variable	N	Range	Mean		Std. Deviation	Variance
			Statistic	Std. Error		
Q 1_1	253	4	3.66	.069	1.096	1.201
Q 1_2	253	4	3.93	.061	.972	.944
Q 1_3	253	4	3.49	.075	1.201	1.441
Q 1_4	253	4	3.75	.066	1.044	1.091
Q 1_5	253	4	3.64	.070	1.106	1.222
Q 1_6	253	4	3.55	.078	1.235	1.526
Q 2_1	253	4	3.66	.069	1.097	1.203
Q 2_2	253	4	3.73	.068	1.083	1.174
Q 2_3	253	4	3.84	.067	1.062	1.128
Q 3_1	253	4	3.62	.065	1.034	1.070
Q 3_2	253	4	3.83	.060	.956	.914
Q 3_3	253	4	3.80	.057	.914	.836
Q 3_4	253	4	3.84	.062	.983	.967
Q 3_5	253	4	3.62	.074	1.171	1.372
Q 3_6	253	4	3.53	.076	1.217	1.480
Q 4_1	253	4	3.95	.063	1.003	1.006
Q 4_2	253	4	3.93	.066	1.050	1.103
Q 4_3	253	4	4.02	.062	.986	.972
Q 5_1	253	4	3.75	.065	1.027	1.055
Q 5_2	253	4	3.68	.066	1.044	1.090
Q 5_3	253	4	3.86	.068	1.082	1.170
Q 5_4	253	4	3.81	.063	1.008	1.017
Q 5_5	253	4	3.98	.058	.923	.853
Q 5_6	253	4	3.92	.061	.971	.943
Q 5_7	253	4	3.86	.059	.939	.882
Q 5_8	253	4	3.78	.064	1.014	1.028
Q 5_9	253	4	3.98	.060	.961	.924
Q 5_10	253	4	4.06	.060	.949	.901
Q 6_1	253	4	4.08	.059	.946	.895
Q 6_2	253	4	3.85	.063	1.001	1.001
Q 6_3	253	4	3.86	.061	.976	.953
Q 6_4	253	4	3.98	.064	1.015	1.031
Q 6_5	253	4	3.87	.064	1.020	1.039
Q 6_6	253	4	3.93	.066	1.042	1.087
Q 6_7	253	4	3.91	.064	1.016	1.032
Q 7_1	253	4	4.28	.056	.892	.796

Q 7_2	253	4	4.09	.063	.996	.992
Q 7_3	253	4	4.17	.065	1.033	1.068
Q 7_4	253	4	4.13	.062	.992	.984
Q 7_5	253	4	4.14	.060	.949	.900
Q 7_6	253	4	4.18	.060	.957	.917

3.2. Reliability analysis of the project management performance measurement

In order to enable a quality statistical analysis of data, that is, in order to generate quality results of the conducted research, it is necessary to determine the reliability and validity of the used measurement scales (McDonald, 1999). For this reason, the internal consistency of the data collection instrument used was assessed using Cronbach's alpha test (Cronbach, 1951). Cronbach's alpha test is applied when the answers to the questions are evaluated based on the degree of the given scales (in the conducted research, a five-point Likert scale with values from 1 to 5 was used).

According to the Cronbach's alpha test, all values of the coefficient α greater than 0.70 represent a good possibility of modeling the results of the questionnaire based on the studied population. Also, satisfactory results of all further analyzes are expected (Nunnalli, 1994). Observing the obtained Cronbach's alpha coefficients of internal consistency of the sets of questions (GQ1 - GQ7), which comprise the questionnaire that assesses the level of project management performance in project-based organizations, the validity and reliability of the questionnaire was confirmed (Table 3). In this way, the selection of all questions in the used questionnaire was confirmed, as well as the correctness of the formed groups of questions within the questionnaire. Finally, all the necessary prerequisites for obtaining reliable results of the conducted research on the project-based organizations' characteristics influence on project management performance they implement have been achieved.

Table 3. Interconsistency coefficients of the questionnaire

Groups of questions	Number of Items	Cronbach alpha coefficient
GQ1	6	0.843
GQ2	3	0.813
GQ3	6	0.810
GQ4	3	0.871
GQ5	10	0.901
GQ6	7	0.908
GQ7	6	0.907

3.3. MANOVA test

During further research, data related to project management performance were analysed considering simple statistical differences (Table 4). The comparison of the difference in the evaluations of the project management performance level among project-based organizations with different characteristics (Number of employees, Years of existence, Ownership structure, and Type of project) was done with Multivariate analysis of variances (MANOVA). Multivariate analysis of variances is applied when there are several correlated dependent variables, and the researcher wants one, overall statistical test on this set of variables instead of performing several individual tests. On the other hand, this test investigates how the independent variables influence some pattern of response on the dependent variables (Larson-Hall, 2010; Stukalin & Einat, 2019). In this research, the aim was to investigate whether there was a significant difference in the assessment of project management performance levels among

organizational subgroups (project-based organizations with different characteristics). In order to conduct this analysis, four groups were distinguished based on the size of the organization, five groups based on the age of the organization, three categories based on the ownership structure, and four groups based on the type of projects (Table 1). The obtained results are shown in Table 4.

Table 4. Project management performance comparisons by number of employees, years of existence, ownership and type of project

Organizations characteristics	Significance	GQ1	GQ2	GQ3	GQ4	GQ5	GQ6	GQ7
No. of employees	F	7.945**	4.097**	6.017**	0.518	1.297	4.256**	2.817*
	p	0.000	0.007	0.001	n.s.	n.s.	0.006	0.040
Years of existence	F	7.456**	3.495**	3.386*	4.092**	9.405**	12.799	9.006
	p	0.000	0.008	0.010	0.003	0.000	0.000	0.000
Ownership structure	F	5.109**	5.546**	4.322*	2.077	1.251	2.410	2.153
	p	0.007	0.004	0.014	n.s.	n.s.	n.s.	n.s.
Type of project	F	1.307	0.822	2.422	0.662	0.289	1.388	4.082**
	p	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	0.007

** statistically significant at 0.01 level
* statistically significant at 0.05 level

4. DISCUSSION OF RESULTS

The demographic characteristics of the respondents are shown in Table 1. A significantly larger number of male respondents participated in the research, 191 of them (75.5%). On the other hand, the number of female respondents was only 62 (24.5%). This ratio of the number of respondents by gender can be explained by the fact that almost half of the respondents are employed in companies that deal with the realization of construction projects (48.2%). In observing the age structure of the respondents, it is noticeable that slightly more than half of the respondents, 132 of them (52.1%) are in the most productive age, from 36 to 55 years old. In observing years of experience, it can be seen that out of the total number of respondents, 58 of them (22.9%) have been working for less than 5 years in the company where they are currently employed. On the other hand, only 20 respondents (7.9%) who have been working in the company for more than 31 years participated in the research. All the rest respondents have been working between 6 and 30 years, 175 of them (69.2%). The educational structure of the respondents shows that the largest number of respondents have completed high school, 169 of them (66.8%), while 54 respondents (21.3%) have completed university and only 3 respondents (1.2%) have a doctoral degree. This data is consistent with the data that 68.0% of production workers on projects participated in the research, while 22.5% were project managers.

Previous data indicate the fact that a fairly experienced workforce is engaged in the realization of projects in the Republic of Serbia. Also, a fairly high educational level of workers engaged in projects is noticeable, which can be explained by the high unemployment rate, and individuals accept jobs that require a lower educational level (especially on construction projects).

When observing the results of descriptive statistics (Table 2), it can be noticed that the mean value of the worst rated question by the respondents is 3.49. On the other hand, the mean value of the best rated question is 4.28. Such a small difference between the extreme values of the evaluation of items in the questionnaire, show that employees have a fairly uniform attitude towards all criteria for evaluating project management performance. According to the

respondents, there is no criterion for evaluating project management performance that is unsatisfactorily developed. On the other hand, respondents believe that there are no criteria that can be assessed as extremely developed. The standard deviation in respondents' answers ranges from 0.892 to 1.235. Such high values of the standard deviation in the respondents' answers indicate a different perception of the criteria for evaluating project management performance in different groups of respondents. Such a pronounced difference in the perception of the evaluated items is present among production workers on the project and project managers.

The reliability and validity of the measurement scales used in the research was determined based on the evaluation of the internal consistency coefficients of the questionnaire, using the Cronbach alpha test. Based on the obtained results (Table 3), it can be concluded that there is mutual consistency of all variables within all 7 groups of questions of the applied model (the obtained values of Cronbach's alpha coefficients for all 7 groups of questions are significantly above the minimum recommended value of 0.7) (Nunnalli, 1994).

In the continuation of the research, data about project management performance were analysed based on simple statistical differences (Table 4). The purpose was to investigate whether there is a significant statistical difference in the perception of project management performance between organizational subgroups, or not. Organizational subgroups are located within the following organizational groups: Number of employees in the organization (four categories of organizations according to the number of employees), Years of the existence of the organization (five categories of organizations according to years of existence), Ownership structure (three categories - domestic ownership, foreign ownership, and mixed ownership) and Type projects (four categories of organizations according to the type of projects they realize). In this way, subgroups of organizations were formed within the aforementioned groups of organizations. Groups of organizations actually represent certain characteristics of organizations.

Observing the results in Table 4, it can notice the existence of certain differences in the respondents' answers in companies with different characteristics. The first organizational characteristic is Number of employees in the organization. Statistically significant differences in respondents' responses appear in five of the seven criteria for evaluating project management performance (GQ1 – Leadership, GQ2 – Staff, GQ3 – Policy and Strategy, GQ6 – Key Performance Indicators – KPIs, and GQ7 – Project Management Performances - PMP), while there are no statistically significant differences in the remaining two criteria for evaluating project management performance.

The next organizational characteristic is Years of existence of the organization. Statistically significant differences in respondents' answers appear for all seven criteria for evaluating project management performance (GQ1 – Leadership, GQ2 – Staff, GQ3 – Policy and Strategy, GQ4 – Partnership and Recourses, GQ5 – Project life cycle, GQ6 – Key Performance Indicators – KPIs, and GQ7 – Project Management Performances - PMP).

The third organizational characteristic is Ownership structure. Considering the respondents' answers from the aspect of this organizational characteristic, statistically significant differences between them occur in three criteria for project management performance evaluation (GQ1 – Leadership, GQ2 – Staff, GQ3 – Policy and Strategy), while there are no significant differences in the remaining factors.

The last examined organizational characteristic is Type of project. Statistically significant differences in the responses of respondents who work in organizations that realize different types of projects occur only with GQ7 - Project Management Performances - PMP, while with all other criteria for evaluating project management performance, there are no statistically significant differences.

Finally, it can be concluded that Number of employees in the organization and Ownership structure as organizational characteristics have a significant influence on the perception of criteria for project management performance evaluation by employees. Years of the existence

of the organization is an organizational characteristic that creates a completely different perception of employees regarding the criteria for evaluating project management performance. Finally, Type of project almost does not affect the perception of criteria for evaluating project management performance.

5. CONCLUSION

The analysis of the influence of the characteristics of project-based organizations on the project management performance assessment, as the final result, provides certain conclusions. Project management performance in project-based organizations can be reliably assessed using a model with 41 questions, divided into 7 groups. In accordance with the basic objective of the conducted research, the focus was on four control questions related to the characteristics of project-based organizations. Using Multivariate analysis of variances (MANOVA) it was determined that two of the four characteristics of project-based organizations (Number of employees in the organization and Ownership structure) exert a partial influence on the perception of criteria for project management performance evaluation. These two characteristics of project-based organizations have a significant influence on employees' opinions regarding the following criteria for project management performance evaluation: Leadership, Staff, and Policy and Strategy. On the other hand, Years of existence of the organization is an organizational characteristic that creates a completely different perception of employees regarding the criteria for project management performance evaluation. From there, it can be concluded that the project management performance is distinctly different in companies that have been operating in the business environment for a different number of years. It is obvious that experience (number of successfully completed projects) has a positive effect on project management performance, which is fully expected. On the other hand, the influence of the Type of project on project management performance is almost non-existent, which can be assessed as an unexpected result. Finally, it can be concluded that different project management performances are achieved in organizations with different years of existence and that this effect is partially observed in organizations of different sizes and different ownership structures.

ACKNOWLEDGEMENTS

The research presented in this paper was done with the financial support of the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, within the funding of the scientific research work at the University of Belgrade, Technical Faculty in Bor, according to the contract with registration number 451-03-47/2023-01/ 200131.

REFERENCES

Bourne, M., Franco-Santos, M., Micheli, P., & Pavlov, A. (2018). Performance measurement and management: A system of systems perspective. International Journal of Production Research, 56, 2788–2799.

Bryde, D. J. (2003). Modelling project management performance. International Journal of Quality & Reliability Management, 20(2), 229–254.

Bryde, D.J. (2008). Perceptions of the impact of project sponsorship practices on project success. International Journal of Project Management, 26(8), 800–809.

Chan, A. P. C., Chan, A. P. L. (2004). Key performance indicators for measuring construction success. Benchmarking: An International Journal, 11(2), 203–221.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika, 16, 297–334.

Delise, L. A., Lee, B., & Choi, Y. (2023). Understanding project management performance using a comparative overrun measure. International Journal of Project Management, 41, 102450.

Ika, L. A., Love, P. E. D., & Pinto, J. K. (2022). Moving beyond the planning fallacy: The emergence of a new principle of project behavior. IEEE Transactions on Engineering Management, 69(6), 3310-3325.

Jiang, J. J., Klein, G., Wu, S. P. J., & Liang, T. P. (2009). The relation of requirements uncertainty and stakeholder perception gaps to project management performance. The Journal of Systems and Software, 82, 801–808.

Larson-Hall, J. (2010). A Guide to Doing Statistics in Second Language Research Using SPSS. Routlege, Taylor & Francis, New York and London.

Lim, C. S., & Mohamed, M. Z. (1999). Criteria of project success: an exploratory reexamination. International Journal of Project Management, 17(4), 243–248.

McDonald, R. P. (1999). Test theory: A unified treatment. Mahwah, NJ: Lawrence Erlbaum.

Milijić, N., Jovanović, I., & Popović, M. (2020). Project management performance analysis in project-based organizations in Serbia. XXIV XXIV International Congress on Project Management „Hybrid Project Management: The Imperative of the Future“. Book of Proceedings, 120-125. (In Serbian)

Milijić, N., Jovanović, I., Stojanović, A., & Popović, M. (2020). Multicriteria analysis of project management performance within project-based organizations, XVI International May Conference on Strategic Management – IMCSM20, Book of Proceedings, Volume XVI, Issue (1), 482-489.

Mir, F. A., & Pinnington, A. H. (2014). Exploring the value of project management: Linking Project Management Performance and Project Success. International Journal of Project Management, 32, 202–217.

Muller, R., & Jugdev, K. (2012). Critical success factors in projects, Pinto, Slevin, and Prescott - the elucidation of project success. International Journal of Project Management, 5(4), 757–775.

Müller, R., & Turner, R. (2007). The influence of project managers on project success criteria and project success by type of project. European Management Journal, 25(4), 298–309.

Nunnally, JM. (1994). Psychometric Theory, third ed. McGraw-Hill, New York.

Quereshi, T. M., Warriach, A. S., & Hijazi, S. T. (2009). Significance of project management performance assessment (PMPA) model. International Journal of Project Management, 27, 378–388.

Stukalin, Y., & Einat, H. (2019). Analyzing test batteries in animal models of psychopathology with multivariate analysis of variance (MANOVA): One possible approach to increase external validity. Pharmacology Biochemistry and Behavior, 178, 51-55.

Volume XIX, Issue (1) (2023) 624-633

International May Conference on Strategic Management

ACADEMIC ETHICS AS SEEN BY STUDENTS – THE CENTRAL-EUROPEAN CASE

Noémi Piricz[1*], Danijela Voza[2]

[1]Óbuda University, Keleti Károly Faculty of Business and Management, Hungary;
[2]University of Belgrade, Technical faculty in Bor, Serbia

Abstract: The intensive ethical dilemmas characterize the contemporary world, so ethics as a scientific discipline is even more present in the scientific world and the educational system. Numerous universities offer their students the opportunity to study ethics as a scientific field. That enables young people to become more familiar with her and the application of her theories in everyday decision-making. At the faculties of business and management, business ethics is receiving more and more attention after numerous scandals, the center of which were the most famous multinational companies. In addition to family, friends, and national culture, education is important in creating, adopting, and disseminating ethics. Higher education institutions should not be singled out in this, even though, as a rule, they do not deal with an educational role. Professors should be a model for creating morally responsible future generations.
This research aimed to determine students' perception of ethical issues in the University environment. The authors examined how demographic characteristics influence their ethical attitudes and tried to define the ethical dimensions in their perception of the faculty's role in the individual's ethics. In order to achieve this goal, a survey was conducted among students from Hungary and Serbia. ANOVA and factor analysis processed the obtained data set. The results indicate that students consider the faculty an important factor in shaping individual ethics. Conversely, students are sometimes held to different ethical standards than other constituents.

Keywords: academic ethics, students, university, perception

1. INTRODUCTION

Today's universities and colleges face many challenges and expectations. From an ethical point of view, they have to deal with academic dishonesty and, as the last educational institution in chronological order, they should set a good example. The reality is that university students are prone to commit various acts of dishonesty, such as fraud and plagiarism (Ashworth et al., 1997; McCabe, 2005; De Lambert et al., 2006). It seems that students who exhibit these acts during their university years tend to continue this bad behavior in the workplace (Payan et al., 2010). Violations of scientific integrity/ethics are a widely researched phenomenon. It is investigated from the student side and less frequently from the academic staff side. Researchers are looking for answers as to whether it varies with age, or it is less pronounced among PhD students, whether it depends on gender, type of education, or

[*] *Corresponding author: piricz.noemi@kgk.uni-obuda.hu*

whether it shows country- or culture-specific signs. But some think it is worth looking at academic ethics and its violations from a digital and non-digital perspective (e.g. Kukolja Taradi et al., 2012).

In addition to the sub-issues of academic ethics, academic ethics is also an important area of research because many empirical studies show that the vast majority of students are affected by, and therefore act against, academic ethics (e.g. Harris, 2004; De Lambert et al., 2006; Carpenter et al., 2010; Toprak, 2017). There are many ways to improve the situation, but the academic evidence so far suggests that these methods and tools have not been very successful.

In our study, we first present some recent research in academic ethics, indicating the most common aspects. We then turn to our empirical research, in which we interviewed students in Hungary and Serbia about some aspects of academic ethics. Our research is significant in that there are relatively few publications from the Central European region.

2. RELEVANT LITERATURE REVIEW

The original meaning of the word 'ethics' can be traced back to ancient Greek (ethos), meaning custom, manners, tradition. Its subject is morality, its origin, nature and structure. In today's understanding, ethics is a philosophical science dealing with morality, a collection of norms and rules of behavior. It varies from one historical period to another, adapting to the society of the time. According to Hornby (2015) “ethics as moral principles that controls or influences person’s behavior, professional or business or is a branch of philosophy that deals with moral principles”. Ethical behavior involves honesty, justice, fairness, and other good virtues (Grigoropoulos, 2019).

Applied ethics, or professional ethics, describes the ethical standards for the practice of a profession. “While ethics describes the set of moral positions that are possible generally, integrity describes the subset of consistent moral positions (ethics) held by a specific actor.” (Jordan, 2013:246) In other words “academic integrity is the moral code or ethical policy of academia” (McCabe, 2016). Academic integrity means that students carry out their own work without the unauthorized assistance of others or without cheating, lying, plagiarism or theft. When academic integrity is achieved, we see that the student is trustworthy and honest enough to do his or her own work, whether or not it is being checked. Pavela (1997) distinguishes between four types of violations of academic integrity: cheating, plagiarism, fabrication of information, or facilitation of such misconduct.

Why do students not follow the standards of academic ethics? Why do they choose unethical behavior? Harris (2004) found that the majority of asked students cheat for selfish interests. Benjamin (2001) concludes that students choose unethical behavior in order to gain recognition. According to Alnajjar and Hashish (2021), the reason for unethical behavior is simply to allow such behavior, i.e. the opportunity is given, so why not. In support of this, several authors have indicated that the increasing trend of plagiarism among university students can be attributed to several factors, such as lack of general ethical knowledge, ineffective plagiarism education, non-conforming plagiarism rules, individual dishonesty, contemporary culture and inadequate sanctioning (e.g. Fischer & Zigmond, 2011; Choi, 2019) This negative trend is supported by the extensive use of the internet and its ever-expanding offers, sometimes poor English skills, the burden of difficult tasks and the fear of failure (e.g. Carpenter et al., 2010; Alnajjar & Hashish, 2021; Blau et al., 2021). The reasons may include what Brimble (2016) refers to as the neutralizing effect, which refers to the fact that although students feel that their behavior was wrong, they deny it, blaming external factors or other people.

Researchers have looked at students' views on academic ethics from a number of perspectives (see Table 1 for a summary). Ludlum et al. (2017) interviewed Finnish students, and concluded that the students' cheating depends on a number of demographic factors, such as gender, age, marital status, or year in school. Kukolja Taradi et al. (2012) made a survey in Croatia and reported that 97% of respondents violated academic integrity. Alnajjar and Hashish (2021) examined in detail the views of nursing students on several ethical issues. They found low levels of ethics in terms of plagiarism, but much higher levels and sensitivity in terms of ethics in relation to patients, and professional ethics in general. McCrink (2010), Cho and Hwang (2019) found similar results. Denat and Tugrul (2023) also surveyed Turkish postgraduate students in health care and found that the higher the academic education, the more sensitive one is to ethical values. Uğurlu and Sert (2020), however, did not support this correlation. This may be because they studied postgraduate students from all fields of study. Desai et al. (2020) are of the opinion that the Covid-19 epidemic has had an impact on ethical behavior. They add that this situation provides a unique opportunity for the development of the skills of PhD students. Sidi et al. (2019), however, found the opposite result, i.e. that there is no difference in the ethical behavior of the academy depending on whether the student is an undergraduate or a postgraduate student and on the number of years.

Results from Taha and Obeidat (2021) in Jordan show that female students are more prone to unethical behavior. However, Pehlivanli and Akin (2019) found that women have stronger levels of academic ethics. On contrary Blau and Eshet-Alkalai (2014) have the view that male students are more likely to violate academic ethical standards. But there is also research that finds no gender differences in academic ethics (e.g., Ives et al., 2017). In this, and in the previous paragraph, we see conflicting scientific results. This may be due to the number of elements in the samples. The research samples used were sufficient to carry out statistical analyses, but - due to a lack of representativeness - could not give an overall picture. Other reasons could be cultural differences, different training and perhaps time differences of data collection.

Table 1. Summary of empirical research publications on academic ethical topics

Research aspects within academic ethics	**Literature, source**
Origin and culture of students	Ludlum et al., (2017); Denat and Tugrul (2023); Taha and Obeidat (2021); Kukolja Taradi et al., (2012)
Level of study (BSc, master or PhD level)	Denat and Tugrul (2023); Uğurlu and Sert (2020); Desai et al., (2020); Taha and Obeidat (2021)
Gender	Pehlivanli and Akin (2019); Blau and Eshet-Alkalai (2014); Taha and Obeidat (2021); Ludlum et al., (2017); Ives et al., (2017)
Type of study program (e.g. nursing, business students)	Alnajjar and Hashish (2021); Denat and Tugrul (2023); Uğurlu and Sert (2020)

Several researchers have made suggestions on how to improve the level of academic ethics in universities (see Figure 1), mainly as a preventive measure. Drumwright et al. (2014) makes clear distinguish among moral awareness, moral intention and moral action therefore offers a free, accessible ethical teaching program, called Ethics Unwrapped. Moris and Caroll (2016) argue for relevant holistic institutional policies, while Brimble (2016) sees the need for a strong university ethical code that motivates students. Intrinsic motivation and the role modelling of instructors are emphasized by many, stating that this is where academic ethics begins (e.g. Moris & Caroll, 2016; Brimble, 2016; Grigoropoulos, 2019). Curtis and Clare (2017) consider the deterrent power of punishment as a solution. Many encourage ethics education, whether through workshops or otherwise, and trust that appropriate ethics

education increases ethical sensitivity and responsibility (e.g. Park et al., 2012; Baykara et al., 2015; Cho & Hwang, 2019; Taha &Obeidat, 2021).

Figure 1. Proposals by scholars to raise the level of academic ethics

According to the literature review, the following hypotheses were defined:

H1: There is statistically significant impact of the gender on student's perception of the ethics in academic environment

H2: There is statistically significant impact of the year of study on student's perception of the ethics in academic environment

3. METHODOLOGY

The data collection for this research was performed by the survey method. The survey was conducted through an online platform and direct contact with respondents. The questionnaire was created by authors Atkinson et al. (2016). It was consisted of three groups of questions. The first group refers to the demographic characteristics of the respondents (country of origin, gender, age, year of study). The second group of questions examines the perception about the role of faculty in promoting ethics. For this group, the respondents expressed the level of agreement with the statements by selecting the number on a five-point Likert scale (1. strongly agree … 5. strongly disagree). In this case, number one indicated complete agreement and five complete disagreements with the specific item. Finally, the third group relates to the students' views on forms of academic dishonesty. This is achieved by asking respondents to indicate what they consider as dishonest selecting from a short list. Respondents were answering the questions by circling Yes or No.

This research was conducted among the students of two universities from Hungary and Serbia. A database of a total of 305 correctly completed questionnaires was created. Demographic structure of the respondents is given in Table 2.

4. RESULTS AND DISCUSSION

To determine if the items within this questionnaire have relatively high internal consistency, the Cronbach alpha test was used. In this case, the value of Cronbach alpha was 0.757, suggesting that the selected questionnaire is reliable.

In order to examine the impact of the students' gender and year of study on perceptions of ethics in the academic environment, ANOVA analysis (Analysis of Variance) was applied. Demographic characteristics were determined as independent, and respondents' attitudes as

dependent variables. A statistically significant influence exists if the significance level (p)<0.05. In this way, the influence of factors on each dependent variable was determined. Data processing was performed using the SPSS v.17.0 software package.

Table 2. Demographic statistics

Grouping Category	**Grouping Title**	**Frequency**	**Percent**
Country	Hungary Serbia	194 111	63.6 36.4
Gender	Male Female	154 151	50.5 49.5
Age	18-21 22-25 26-29 30-40 40+	131 105 32 30 7	43.0 34.4 10.5 9.8 2.3
Year of study	1st year Bachelor 2nd year Bachelor 3rd year Bachelor 4th year Bachelor Master level Ph.D. level	91 71 57 73 9 4	29.8 23.3 18.7 23.9 3.0 1.3

The results of univariate ANOVA test for gender and year of study revealed no significant group differences with respect to the students' perception of the role of the faculty on improving their ethical standards. When it comes to the third group of questions relates to the students' views on forms of academic dishonesty, the results of univariate ANOVA revealed significant group effect (difference) for the independent variable of gender. By analyzing the mean values shown in Table 3. It was noticed that the females reported more negative attitudes toward cheating, while male student responses tend to indicate their more permissive attitudes.

Table 3. Descriptive statistics - Gender

Item	**Gender**	**N**	**Mean**	**STDV**
Q10_1 Personally, I consider plagiarism to be a form of academic dishonesty.	female	151	1.1788	.41771
	male	154	1.2987	.45918
Q10_2 Personally, I consider submitting another person's work as my own to be a form of academic dishonesty.	female	151	1.1258	.33276
	male	154	1.1688	.37582
Q10_3 Personally, I consider copying off of other student's exam papers to be a form of academic dishonesty.	female	151	1.1523	.37856
	male	154	1.3052	.46199
Q10_4 Personally, I consider texting other students' exam questions while testing to be a form of academic dishonesty	female	151	1.5232	.51426
	male	154	1.6429	.48072
Q10_5 Personally, I consider failing to report others observed cheating to be a form of academic dishonesty.	female	151	1.6954	.46178
	male	154	1.7922	.40705

Statistically significant impact of year of study on students' attitudes towards unethical acts is recognized only in the case of question Q10_5 which reads: *Personally, I consider failing to report others observed cheating to be a form of academic dishonesty*.

Table 4. Descriptive statistics - Year of study

Item	Year of study	N	Mean	STDV
Q10_5 Personally, I consider failing to report others observed cheating to be a form of academic dishonesty.	1st	91	1.6154	.48920
	2nd	71	1.7183	.45302
	3rd	57	1.8082	.39643
	4th	73	1.9123	.28540
	Master	9	1.6667	.50000
	Ph.D.	4	1.7443	.43699

The relationship between the year of study and interest in reporting academic dishonesty is determined. According to the descriptive (Table 4), the students on higher year of study don't consider failing to report others' observed cheating as a form of academic dishonesty.

The next step in this research was to reduce the items from the questionnaire to a smaller number of factors by applying the Factor analysis. By conducting Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity, scores of 0.843 and 947.480 were obtained, respectively (Table 5). These results indicate the possibility of applying factor analysis to the obtained data set.

Table 5. KMO and Bartlett's Test scores

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.843
Bartlett's Test of Sphericity	Approx. Chi-Square	947.480
	df	36
	Sig.	.000

Factor analysis revealed two main components with eigenvalues greater than one (Eigenvalues >1) (Figure 2. Screeplot). Both factors explain approximately 58.12% of the total variance Factor 1 31% and Factor 2 27.2% (Figure 3).

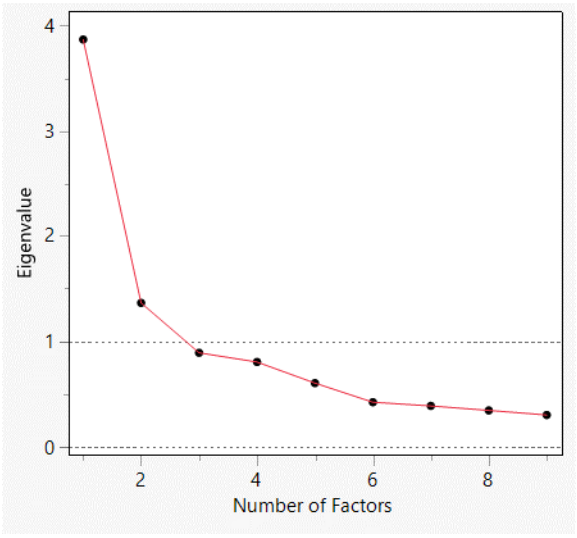


Figure 2. Screeplot

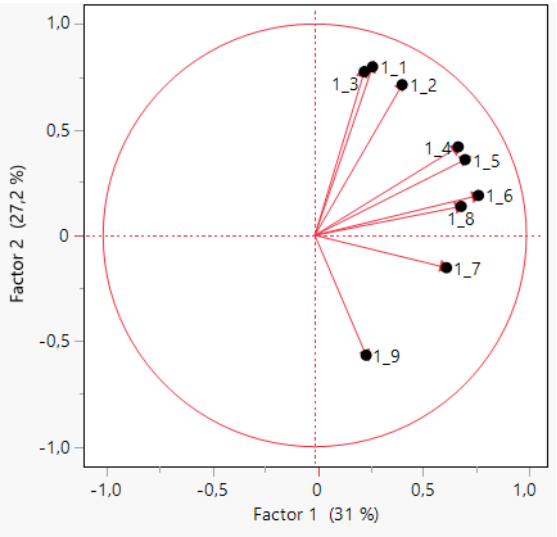


Figure 3. Factor loading plot

Factor loadings and total variance for each item are presented in Table 6.

Table 6. Factor loadings

	Component	
	1	2
Q_1 College education should play significant role in teaching student about ethics.	.285	.794*
Q_2 Faculty helps students develop values in their classes.	.415	.711*
Q_3 Faculty incorporates ethics instructions into their classes.	.238	.771*
Q_4 Faculty should enforce ethical standards with their students.	*.688***	.399
Q_5 Ethics are very important to me.	.709*	.355
Q_6 I hold myself to the same ethical standard to which I hold others.	.772*	.193
Q_7 In general, students abide by the University's Honor Code.	*.619***	-.149
Q_8 I consider the faculty in my major to be ethical human beings.	*.690***	.142
Q_9 By the time student reaches college; it is too late to teach them about ethics.	.261	-*.573***

*strong factor loadings
**medium factor loadings

In VF1, strong positive loadings were assigned to questions Q5 and Q6, while medium positive loadings were assigned to questions Q4 (0.688), Q7 (0.619), and Q8 (0.690). Analysis of the questions assigned to this group indicated they mostly refer to personal attitudes toward ethical issues. Students believe they are ethical and respect ethical standards but expect the same from those around them.

VF2 explains 27.16% of the total variance, and the strongest positive load is recorded in questions Q1, Q2, and Q3. In contrast, the average negative load is assigned to question Q9. VF2 refers the influence of the teaching process on ethics. Based on the selected items in this VF, students believe that professors should promote ethical behavior and values during classes. Also, they believe that higher education has a significant role in developing and improving individual ethics.

5. CONCLUSIONS AND SUGGESTIONS

Although our research brought some unexpected results, we can say that in general, ethics and ethical behavior are considered important by students (see Q5 as a strong factor). They even try to hold themselves to their ethical standards (Q6 as another strong factor). But it is the details of the ethical aspects that seem to be the most interesting. Perhaps we could say that people want to behave ethically, but in practice this is very difficult.

Our findings suggest that female students perceive slightly stricter academic ethical standards as more important, but the literature is divided on this issue (see our literature review). This suggests that understanding this requires deeper, more rigorous research. It may be that cultural - in some cases religious - background plays larger role, perhaps which generation he/she belongs to, but it can also be assumed that it changes over time. There may be a dynamic, interactive relationship with age and which year in university the respondent is, as well as what education he/she has.

Denat and Tugrul (2023) argue that the perceived, expected level of academic ethics increases in higher grades. Our results, however, confirm the conclusions of Sidi et al. (2019) that the academic ethics expectations of students in postgraduate education are not higher than those of students in undergraduate education.

Our research confirms that the example of lecturers and faculty members matters (see Q8) and these results are similar to several previous studies (e.g. Brimble, 2016; Curtis & Clare, 2017; Morris, 2018). We see that students not only expect the university to set an

example, but also to enforce ethical standards (Q4), so this means it is not too late for the university to be active in raising the ethical and academic ethical standards and awareness. This might also prevent the neutralization effect that could occur.

Generally we believe that academic ethics is still relevant in the 21st century and that it is worthwhile to investigate new challenges (e.g. digital opportunities, AI), but that the wide-ranging and complex nature of the subject may sometimes require creative, innovative methodologies that can deal with the complexity of the factors at play and the fact that, on the one hand, people are by nature more ethical in theory than in critical situations, and on the other hand, they are fundamentally concerned to comply with the rules around them.

ACKNOWLEDGEMENT

This work was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia, as part of the financing of scientific research work at the University of Belgrade, Technical Faculty in Bor, according to the contract with registration number 451-03-47/2023-01/ 200131

REFERENCES

Alnajjar, H.A., & Abou Hashish, E.A. (2021). Academic Ethical Awareness and Moral Sensitivity of Undergraduate Nursing Students: Assessment and Influencing Factors. SAGE Open Nursing, 7, 1–9.

Ashworth, P., Bannister, P., & Thorne, P. (1997). Guilty in whose eyes? University students' perceptions of cheating and plagiarism in academic work and assessment. Studies in Higher Education, 22(2), 187-203.

Atkinson, J.K., Coleman, P.D., & Waduge, S.A. (2016). College Students' Perceptions of Ethics. Academy of Business Research Journal; Gulfport, 2, 7-18.

Blau, I., & Eshet-Alkalai, Y. (2016). How digital technologies affect academic dishonesty behavior of school students? Paper presented at the international conference on internet studies—NETs2016. Osaka, Japan

Blau, I., Goldberg, S., Friedman, A., & Eshet-Alkalai, Y. (2021). Violation of digital and analog academic integrity through the eyes of faculty members and students: Do institutional role and technology change ethical perspectives? Journal of Computing in Higher Education, 33(1), 157-187.

Baykara, Z., Demir, S., & Yaman, S. (2015). The effect of ethics training on students recognizing ethical violations and developing moral sensitivity. Nursing Ethics, 22(6), 661–675.

Benjamin, F.O. (2001) Causes of Examination Malpractices in School.

Brimble, M. (2016). Why Students Cheat: An Exploration of the Motivators of Student Academic Dishonesty in Higher Education. In: Handbook of Academic Integrity, 365–382, Springer.

Carpenter, D. D., Harding, T. S., & Finelli, C. J. (2010). Using research to identify academic dishonesty deterrents among engineering undergraduates. International Journal of Engineering Education, 26(5), 1156–1165.

Cho, O. H., & Hwang, K. H. (2019). Academic ethical awareness among undergraduate nursing students. Nursing Ethics, 26(3), 833–844.

Choi, J. (2019). Cheating behaviors and related factors at a Korean dental school. Korean Journal of Medical Education, 31(3), 239–249.

Curtis, G.J. & Clare, J. (2017). How prevalent is contract cheating and to what extent are students repeat offenders? Journal of Academic Ethics, vol. 15, no. 2, 115–124.

De Lambert, K., Ellen, N., Taylor, L. (2006). Chalkface challenges: a study of academic dishonesty amongst students in New Zealand tertiary institutions. Assess Eval Higher Education, 31(5), 485-503.

Denat, Y. & Tugrul, E. (2023) Ethical Value Inclinations and Academic Ethical Values Of Postgraduate Health Science Students. Gevher Nesibe Journal of Medicine and Health Sciences. Vol: 8, Issue: 1, 51-60.

Desai, A., Lankford, C., & Schwartz, J. (2020). With crisis comes opportunity: Building ethical competencies in light of COVID-19, Ethics & Behavior, 30:6, 401-413.

Drumwright, M., Prentice, R., & Biasucci C. (2015). Behavioral Ethics and Teaching Ethical Decision Making. Decision Sciences Journal of Innovative Education, 13 (3), 431-458.

Fischer, B. A., & Zigmond, M. J. (2011). Educational approaches for discouraging plagiarism. Urologic Oncology: Seminars and Original Investigations, 29(1), 100–103.

Grigoropoulos, J.E. (2019). The role of ethics in 21st century organization. International Journal of Progressive Education, vol. 15, 167–175.

Harris, R. (2004). Antiplagiarism strategies for Research papers. http://www.academicintegrity.org /resources (retrieved 20th March, 2020).

Hornby, A.S. (2015), Oxford Advanced learners Dictionary of Current English. New York: Oxford University Press.

Ives, B., Alama, M., Mosora, L. C., Mosora, M., Grosu-Radulescu, L., Clinciu, A. I., Cazan, A.M., Badescu, G., Tufis, C., Diaconu, M., Dutu, A. (2017). Patterns and predictors of academic dishonesty in Romanian university students. Higher Education, 74(5), 815–831.

Jordan, S.R. (2013). Conceptual Clarification and the Task of Improving Research on Academic Ethics. Journal of Academic Ethics, 11, 243–256.

Kukolja Taradi, S., Taradi, M., & Dogas, Z. (2012). Croatian medical students see academic dishonestyas an acceptable behavior: A cross-sectional multicampus study. Journal of Medical Ethics, 38(6), 376–379.

Ludlum, M., Hongell, L., & Teeman, J (2017). Academic Ethics: a Pilot Study on the Attitudes of Finnish Students. Journal of Academic Ethics, 15(4), 1-14.

McCabe, D. (Obituary). (2016). Academic ethics. Star-Ledger. (Accessed on April 20, 2023) Retrieved from http://obits.nj.com/obituaries/starledger/obituary.aspx?pid=181490279

McCrink, A. (2010). Academic misconduct in nursing students: Behaviors, attitudes, rationalizations, and cultural identity. Journal of Nursing Education, 49(11), 653–659.

Morris, E.J., & Carroll, J. (2016). Developing a Sustainable Holistic Institutional Approach: Dealing with Realities in Handbook of Academic Integrity, pp. 449–462, Springer.

Morris, E.J. (2018). Academic integrity matters: five considerations for addressing contract cheating. International Journal for Educational Integrity, vol. 14, no. 1

Park, M., Kjervik, D., Crandell, J., & Oermann, M. (2012). The relationship of ethics education to moral sensitivity and moral reasoning skills of nursing students. Nursing Ethics, 19(4), 568–580.

Payan, J., Reardon J., & McCorkle, D. E. (2010). The effect of culture on the academic honesty of marketing and business students, Journal of Marketing Education, 32 (3), 275–291.

Pavela, G. (1997). Applying the power of association on campus: A model code of academic integrity. The Journal of College and University Law, 24(1), 1–22.

Pehlivanli, A. E., & Ve Akin, A. (2019). Examination of academic ethics and workaholism levels according to demographic variables: an empirical study. International Journal of Social Studies, 12(65), 1209-1226 (in Turkish).

Sidi, Y., Blau, I., & Eshet-Alkalai, Y. (2019). How is the ethical dissonance index affected by technology, academic dishonesty type and individual differences? British Journal of Educational Technology, 50(6), 3300–3314.

Taha, S.M. & Obeidat, O.A. (2021). The Academic Ethics of Graduate Students at Yarmouk University: From the Point of View of the Students Themselves. International Journal of Higher Education, 10 (4), 235-246.

Toprak, Z. (2017). Academic writing: plagiarism and originality in Turkey. Boğaziçi University Journal of Education, 34(2), 1-12.

Uğurlu, N., & Sert, H. (2020). Determination of the Attitudes of Postgraduate Students Toward Academic Ethical Values. Journal of Educational Theory and Practice Research, 6 (3), 322-336.

TABLE OF CONTENTS:

XVII INTERNATIONAL MAY CONFERENCE ON STRATEGIC MANAGEMENT – IMCSM23

Plenary papers

Conference papers