XII MEĐUNARODNI SIMPOZIJUM
INŽENJERSKI MENADŽMENT I KONKURENTNOST
EMC 2022

EMC2022

12th International Symposium
"Engineering Management and
Competitiveness" 2022

UNIVERZITET U NOVOM SADU
TEHNIČKI FAKULTET "MIHAJLO PUPIN"
ZRENJANIN

University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Republic of Serbia

Szent István University, Faculty of Economics and Social Sciences, Gödöllő, Hungary

Voronezh State University, Faculty of Economics, Voronezh, Russia

University of Montenegro, Maritime Faculty Kotor, Kotor, Montenegro

XII International Symposium

ENGINEERING MANAGEMENT AND COMPETITIVENESS

(EMC 2022)

Proceedings

17-18th of June 2022, Zrenjanin, Serbia

Organizer of the Symposium:
University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Republic of Serbia

Partners:
Szent István University, Faculty of Economics and Social Sciences, Gödöllő, Hungary
Voronezh State University, Faculty of Economics, Voronezh, Russia
University of Montenegro, Maritime Faculty, Kotor, Montenegro

Publisher: University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Đure Đakovića bb, 23000 Zrenjanin

For publisher: Dragica Radosav, Ph.D, Professor, Dean of Technical faculty

Reviewers:
Ivana Berković, Ph.D, Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Republic of Serbia
Agneš Slavić, Ph.D, Professor, University of Novi Sad, Faculty of Economics Subotica, Subotica, Republic of Serbia

Technical treatment:
Dragan Ćoćkalo, Ph.D, Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Republic of Serbia
Mihalj Bakator, Ph.D, Assistant, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia
Dragana Milosavljev, M.Sc, Assistant, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Republic of Serbia
Verica Gluvakov, B.Sc, Teaching associate, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Republic of Serbia

Cover design:
Ivan Palinkaš, M.Sc, Assistant, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Republic of Serbia

Lecturer:
Edit Terek Stojanović, Ph.D, Assistant professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Republic of Serbia

ISBN: 978-86-7672-353-9

CIP - Каталогизација у публикацији
Библиотеке Матице српске, Нови Сад

62:005(082)(0.034.2)

INTERNATIONAL Symposium Engineering Management and Competitiveness (12 ; 2022 ; Zrenjanin)
Proceedings [Elektronski izvor] / XII International Symposium Engineering Management and Competitiveness (EMC 2022), 17-18th June 2022, Zrenjanin ; [organizer] Technical Faculty "Mihajlo Pupin", Zrenjanin. - Zrenjanin : Technical Faculty "Mihajlo Pupin", 2022. - 1 elektronski optički disk (CD ROM) ; 12 cm

Sistemski zahtevi: Nisu navedeni. - Dostupno i na: http://www.tfzr.rs/emc. - Nasl. sa naslovnog ekrana. - Bibliografija uz svaki rad. - Registar.

ISBN 978-86-7672-353-9

a) Инжењерски менаџмент -- Зборници

COBISS.SR-ID 68068873

Program Committee:

Dragan Ćoćkalo, Ph.D, Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia – President of the Program Committee

Sanja Stanisavljev, Ph.D, Assistant Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia – Vice President of the Program Committee

Ješa Kreiner, Ph.D, Professor, California State University, Department of Engineering, Fullerton, CA, USA

Poór József, Ph.D, Professor, Szent István University, Gödöllő, Hungary

Ali Reza Afshari, Ph.D, Assistant professor, Islamic Azad University, Iran

Mohammad Anisseh, Ph.D, Professor, Imam Khomeini International University, Qazvin, Iran

Ioannis Filippopoulos, Ph.D, Professor, University of Thessaly, Department of Computer Science, Lamia, Greece

Boštjan Antončič, **Ph.D**, Professor, University of Ljubljana, Faculty of Economics, Ljubljana, Slovenia

Larisa Nikitina, Ph.D, Professor, Voronezh State University, Management Department, Russia

Danilo A. Đurović, Ph.D, Professor, University of Montenegro, Maritime Faculty, Kotor - Dobrota, Montenegro

Robert Minovski Ph.D, Professor, "Ss. Cyril and Methodi" University in Skopje, Faculty of Mechanical Engineering, Skopje, North Macedonia

Bojan Jovanovski, Ph.D, Associate professor, "Ss. Cyril and Methodi" University in Skopje, Faculty of Mechanical Engineering, Skopje, North Macedonia

Maša Magzan, Ph.D, Assistant Professor, University of Rijeka, Croatia

Teodora Rutar Shuman, Ph.D, Professor and PACCAR Professor Mechanical Engineering, Seattle University, College of Science and Engineering, USA

Zoran Filipi, Ph.D, Professor, Clemson University, Department of Automotive Engineering, South Carolina, USA

Zdenek Dvořák, Ph.D, Professor, University of Žilina, Faculty of Special Engineering, Slovakia

Vesna Spasojević Brkić, Ph.D, Professor, University of Belgrade, Mechanical faculty, Serbia

Cariša Bešić, Ph.D, Professor, University of Kragujevac, Faculty of Technical Sciences, Čačak, Serbia

Matej Černe, Ph.D, Associate Professor, University of Ljubljana, Faculty of Economics, Ljubljana, Slovenia

Milan Delić, Ph.D, Associate Professor, University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia

László Szabó, Ph.D, Assistant Professor, Budapest Business School, Zalaegerszeg Faculty of Business Administration, Zalaegerszeg, Hungary

Jasna Auer Antončič, **Ph.D,** Assistant Professor, University of Primorska, Faculty of Management, Koper, Slovenia

Violeta Cvetkoska, Ph.D, Associate professor, "Ss. Cyril and Methodius" University, Faculty of Economics, Skopje, North Macedonia

Miroslava Petrevska, Ph.D, Lecturer, The College of Tourism, Belgrade, Serbia

Srđan Bogetić, Ph.D., Belgrade Business and Arts Academy of Applied Studies, Belgrade, Serbia

Miloš Vorkapić, Ph.D., Scientific associate, University of Belgrade, Institute of Chemistry, Technology and Metallurgy (ICTM) - Center of Microelectronic Technologies, Belgrade, Serbia

Zvonko Sajfert, Ph.D, Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia

Dejan Đorđević, Ph.D, Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia

Milan Nikolić, Ph.D, Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia – President of the Organizing Committee

Edit Terek Stojanović, Ph.D, Assistant Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia

Organizing Committee:

Milan Nikolić, Ph.D, Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia - President of the Organizing Committee

Edit Terek Stojanović, Ph.D, Assistant professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia – Vice President of the Organizing Committee

Dejan Đorđević, Ph.D, Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia

Dragan Ćoćkalo, Ph.D, Professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia– President of the Program Committee

Sanja Stanisavljev, Ph.D, Assistant professor, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia

Dragana Milosavljev, M.Sc, Assistant, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia

Mihalj Bakator, Ph.D, Assistant, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia

Verica Gluvakov, B.Sc, Teaching associate, University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia

INTRODUCTION

Department of Management and Technical faculty "Mihajlo Pupin" from Zrenjanin have started the organization of International Symposium Engineering Management and Competitiveness (EMC) in 2011. Since 2013 the organization of the EMC symposium has been supported by the following foreign partners: Szent István University, Faculty of Economics and Social Sciences, Gödöllő, Hungary, Voronezh State University, Faculty of Economics, Voronezh, Russia and University of Montenegro, Maritime Faculty, Kotor, Montenegro.

The objectives of the Symposium EMC are: presentation of current knowledge and the exchange of experiences from the field of Engineering management, consideration of development tendencies and trends in Serbia and the world as well, gathering researchers from this field with the aim of expanding regional and international cooperation, raising the level of professional and scientific work at Technical faculty "Mihajlo Pupin" from Zrenjanin, expanding cooperation with economic and educational institutions and encouraging young researchers within this field. Taking into account that this Symposium is international, the importance of this event is obvious for the town of Zrenjanin, Banat region, Vojvodina and Serbia. Organization of EMC by the Technical faculty "Mihajlo Pupin" from Zrenjanin represents this scientific-educational institution as one of the major representatives of economic and social development in Banat.

Within this Proceedings all accepted papers received for XII International Symposium Engineering Management and Competitiveness (EMC 2022) are presented. This year at the symposium we have 45 papers and 1 abstracts. The authors come from 9 countries: Bosnia and Herzegovina, Hungary, Iran, Jamaica, North Macedonia, Russia, Slovenia, USA and Serbia. The papers are divided into seven sessions: Plenary session, Session A: Management and operation management, Session B: Human resource management, Session C: Marketing management, Session D: Economy, Session E: IT Management, Session F: Abstracts.

We wish to thank the Technical faculty "Mihajlo Pupin" from Zrenjanin and the dean Prof. Ph.D Dragica Radosav for their active role concerning the organization of the Symposium. We are also expressing our gratitude to all authors who have contributed with their papers to the organization of our twelfth Symposium EMC.

The EMC Symposiums become a traditional meeting of researchers in June, every year. We are open and thankful for all useful suggestions which could contribute that the next International Symposium Engineering Management and Competitiveness become better in an organizational and program sense.

President of the Programming Committee
Professor Dragan Ćoćkalo, Ph.D.

Zrenjanin, June 2022.

CONTENTS

XII International Symposium Engineering Management and Competitiveness 2022 (EMC 2022)
17-18th June, Zrenjanin, Serbia

Plenary session

Papers (pp. 3-44):

IMPACT OF INTEGRATION MANAGEMENT ON MASHHAD CONSTRUCTION PROJECTS MANAGEMENT PERFORMANCE

Ali Reza Afshari
Department of Construction Management, Shirvan Branch, Islamic Azad University, Shirvan, Iran
E-mail: afshari@mshdiau.ac.ir
Yasaman Mehran
Department of Construction Management, Mashhad Branch, Islamic Azad University, Mashhad, Iran
Elaheh Tavakolian
Department of Management, Shirvan Branch, Islamic Azad University, Shirvan, Iran

ABSTRACT

Construction project performance relies on different dimensions of project management. Among those, integration management is of paramount importance since effective project management starts with the integration of processes and people within a construction project. This study investigates the influence of various components of project integration management on construction project management performance and quantifies the relationship between those components and integration management. The proposed components of integration management are the development of a project charter, knowledge integration, process integration, staff integration, supply chain integration, and integration of changes; whereas the dimensions of project management performance are time, cost, quality, safety, and client satisfaction. A questionnaire was designed and administered to construction professionals and data from 121 projects was analyzed using structural equation modeling. The data was analyzed by using software, called SPSS AMOS. The findings of the research indicate that integration management has a strong impact on project management performance. The study contributes to the project management body of knowledge in that it develops a conceptual framework consisting of specific components for integration management, reveals the impact of integration management on performance, and proposes several tools and strategies for enabling effective integration along the project life cycle. Industry practitioners may benefit from the framework developed by considering the components proposed and following strategies recommended for construction phases.

Key words: Construction management, Project Performance, Project Integration Management, Construction Project management, Construction industry, Project management.

INTRODUCTION

Project integration management ensures the successful coordination among project activities. Asif et al. (2010) mention integration as a deliberate process of developing a governance structure, which makes the management of key stakeholder requirements more systematic. Project integration ensures the proper coordination among project activities. Therefore, the impact of integration management on project success should be well understood so that project managers might benefit from the positive aspects of properly coordinated project activities. A major portion of existing research studies (Halfawy and Froese, 2007; Ozorhon et al., 2014; Berteaux and Javernick-Will, 2015; Ospina-Alvarado et al., 2016) has previously demonstrated the critical role of effective integration in project management research. The Project Management Body of Knowledge Guide (PMBoK) lists the ten main knowledge areas essential to project management and four additional areas in its Construction Extension. Among those, project integration management is listed as the first knowledge area, which involves combination, unification, and coordination processes of project management.

Because of the essential function of integration in project management, this study develops a comprehensive framework which aims at illustrating the strong link between integration and project management performance, which was not previously investigated. Within this perspective, the study

proposes construction-specific components for integration management and measures project management performance by means of different project success indicators. Moreover, a questionnaire was designed based on the developed framework and administered to construction professionals in Mashhad, Iran. The research investigates the hypothesized relationship between integration management and project management performance and aims at measuring project management performance according to the proposed indicators. To analyze the validity and the reliability of the proposed measures for the framework, structural equation modeling (SEM) was used. The main contribution of this study is to guide construction practitioners to adopt proposed measures for integration and benefit from the strategies for integration in order to experience higher success rates.

CONSTRUCTION PROJECT PERFORMANCE

The impact of effective time management on enhanced project performance was highlighted in several studies (Gayatri and Saurabh, 2013; Ngacho and Das, 2014). In Salazar-Aramayo et al.'s (2013) study, cost was listed among the most important attributes of the project management model that they have developed. Ali et al. (2013) emphasized that quality of work done is among the most important attributes of project performance measurement. Popaitoon and Siengthai (2014) mentioned that project performance and knowledge absorptive capacity of project teams are highly affected by project human resource management practices. Badir et al. (2012) stated that communication is one of the key components of improved performance. Hwang et al. (2014) revealed that effective risk management leads to improved project performance. Eriksson and Westerberg (2011) indicated that collaborative procurement practices have a positive influence on construction project performance. Stakeholder benefits and satisfaction were demonstrated to be crucial for project success (Takim and Akintoye, 2002; Rad, 2003; Bassioni et al., 2004) Moreover, Kagioglou et al. (2001) emphasized that stakeholder satisfaction is directly associated with performance management in construction. Cheng et al. (2012) investigated the effect of safety management practices on project performance in the construction industry. Montabon et al.'s (2007) study revealed that there is a strong link between the effectiveness of project environmental management and business performance. Akanni et al. (2015) stated that financial attributes are highly effective on project performance. Halfawy and Froese (2007) presented a multitier component-based framework aiming to facilitate the implementation of modular and distributed integrated project systems for supporting multidisciplinary project processes through the project cycle. The main focus of the research was to emphasize the required functionality and approach to developed integrated project systems. Within this context, a framework was developed to define methods that have potential to improve the availability, consistency, and integration of project information and processes. Ozorhon et al. (2014) focused on the components of the innovation process. They defined the barriers of innovation including resistance to change, inexperience, and unavailability of advanced products and they proposed integration of project participants and effective leadership as one of the solutions to enhance the rate of innovation adoption. However, the paper references one case study selected from the United Kingdom, so the conclusions made could lead to diverse statements with different case studies. Berteaux and Javernick-Will (2015) indicated that project-based organizations in the architecture, engineering, and construction (AEC) industry must integrate knowledge and processes adapting to local environments. They investigated the challenges of local adaptation and organizational integration processes by relating to project performance. They concluded that projects having high integration result in richer information exchange than projects having low integration. However, the research has a small sample size and organizational performance was not included in the study, which is one of the limitations of the research. Ospina-Alvarado et al. (2016) developed a framework for construction project integration by defining several attributes depending on their critical importance. They proposed the framework as a useful tool for construction practitioners to wisely use their resources for achieving a more integrated project. Despite the attributes mentioned in this study such as coordination, collaboration, leadership, knowledge sharing, and trust, the paper still lacks a complete understanding of integration attributes such as integration of changes and uncertainty management in integration. These studies reported that projects experience higher success rates and improved performance with the adoption of an integrative approach. However, these studies rather focused on software integration, relational integration or contractual integration despite the fact that integration

must be evaluated as a core element encompassing different dimensions and impacting several other variables in a project network.

The construction industry still suffers from poor project performance because of its nature where the work is fragmented between different stakeholders and different sub-processes (Rahman and Kumaraswamy, 2004; Ospina-Alvarado and Castro-Lacouture, 2010; Harper, 2014). Moreover, previous studies lack a complete understating of the relationship between integration and performance, which is essential to successfully manage construction projects. However, the impact of integration management on project management performance was not explicitly investigated in these studies; instead, they assess some of the core components of integration on performance. There is no other study in the literature that proposes construction specific components for integration management and analyzes the relationship between integration and project management performance. Revealing this relationship may help construction professionals to evaluate their projects with the essential parameters and understand the logic behind project integration in the cases where it is hard to manage complex projects. It is essential for construction practitioners to understand, quantify, visualize and simulate the components that affect construction work. Hence, the need for conceptual framework arises to best reflect variables which influence construction business. Construction is more challenging than other businesses in terms of its dynamic, fragmented and complex nature since it requires involvement of different parties and successful management of processes. This requires the development of well-set strategies and practices to compete against uncertainties and risks. Cost and schedule variances might create undesired consequences, which lead to low customer satisfaction. Therefore, it is crucial to determine underlying parameters that need to be addressed when project success is of utmost importance. Several studies have been conducted to investigate performance and its relation to different project management constructs. Vickery et al. (2003) mentioned the effects of integrative supply chain on financial performance. Similarly, Kim (2006) investigated the linkage between supply chain integration and firm performance. Mitchell (2006) rather considered the relationship between knowledge integration and information technology performance. As reported, only a limited number of studies the number reveal an explicit linkage between integration management and project management performance. Crawford (2005) states that program or project directors, who use a high level of integration and scope practices are more likely to be top performers. Huang and Newell (2003) also indicated that knowledge integration is determined by three important components: the efficiency of integration, scope of integration, and the flexibility of integration. Heising (2012) underlined the critical role of integration in terms of project portfolio management. In addition, Mitropoulos and Tatum (2000) also indicated that degree of project integration affects project performance. Previous research highlighted the essential function of integration or its attributes on achieving a higher level of performance, success or innovation. For example, Aronson et al. (2013) mentioned the impact of leader building activities and project spirit's role on project success. Similarly, Ozorhon et al. (2014) listed integration and leadership as enablers in construction innovation. Moreover, Crawford (2005) mentioned that project or program directors using high level of integration and scope practices are more likely to be top performers in companies. Saraf et al. (2007) implied that information integration with customers and business partners leads to better knowledge sharing, which also results in business performance improvements. Berteaux and Javernick-Will (2015) highlighted the organizational integration of knowledge, process, and strategy, informing that organizational integration improves project performance through the capabilities developed on previous projects and innovations across the organization, which helps the organization remain competitive. It is also mentioned that integration of knowledge and processes improves project and organizational performance. Since conceptualization and effective planning of projects are crucial, integration appears as a critical component in the proper coordination of projects. As previously shown on above studies, integration is strongly linked to the core elements and areas of project management. Hence, one might conclude that integration has a clear and direct impact on project performance. Therefore, this study aims to fill this gap by developing a framework picturing the core elements of integration and performance. The framework is intended to reflect the relation between integration management and project management performance based on the perceptions of construction companies.

RESEARCH METHODOLOGY

The framework proposed in this study involves the components for integration management and project management performance. In the initial step, based on a comprehensive literature review that focused on studies regarding the integration management and performance, several components are derived. Integration management and project management are factors and 17 components are derived for these two factors. After conducting pilot studies with three university professors and two industry practitioners, some of the components were either combined or removed to best reflect their corresponding factors. Finally, a total of 11 components are obtained. The underlying components of each factor are identified and explained below:

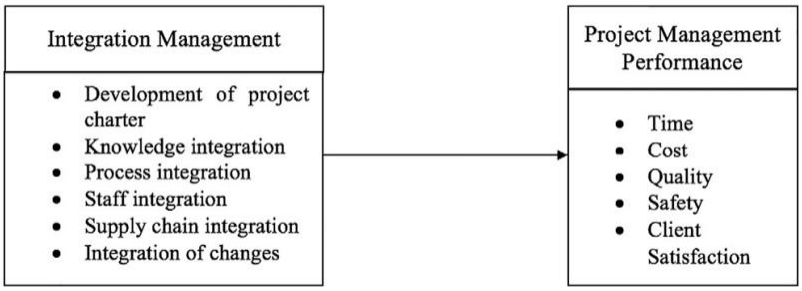


Figure 1: Link between integration management and project management performance

The following hypothesis is developed based on the strong evidence provided by the literature considering the impact of integration management on project management performance.

H1: Effectiveness of "project integration management" has a direct and positive effect on "project management performance" when controlling for project type and project size.

An online questionnaire was designed and administered to construction professionals in Mashhad construction firms based on the proposed framework. The questionnaires were addressed to Construction firms. From the 508 questionnaires sent, 121 were returned, where 22 were face-to-face interviews, resulting in a response rate of 24%. Face-to-face interviews were conducted with 22 professionals to increase the response rate. Respondents were requested to fill in the questionnaires considering the project management practices of their completed projects based on fourteen knowledge areas. The collected data include information regarding 121 different construction projects, which were undertaken by 82 different firms where some of the firms provided multiple data.

RESEARCH FINDINGS

The questionnaire collected data regarding the level of success achieved for each component. Abbreviations were used for each component (I1 = Development of Project Charter, I2 =Knowledge Integration, I3 = Process Integration, I4 = Staff Integration, I5 = Supply Chain Integration, I6 = Integration of Changes). All components are rated around 3.5 and Cronbach's alpha value is calculated as 0.896, which proves the reliability of the components in terms of explaining its construct. Also, abbreviations were used for each component of project management performance (P1 = Time, P2 = Cost, P3 = Quality, P4 = Safety, P5 = Client Satisfaction). It is seen that firms are more successful in achieving "quality" in their projects. It is also shown that firms satisfy "safety" objectives as well as "time". The components omitted for the project integration management construct were: information integration, scope integration, customer integration, and integration of project updates. After having in-depth interviews with industry experts, university professors and based on subjective judgment, some of the components were embedded in the other components since they were thought to be repetitive for deciding on the core components. For example, information integration is evaluated part of the knowledge integration by considering knowledge integration as a core component of integration

management. Similarly, scope integration and integration of project updates are evaluated part of integration of changes since those represent the plan updates and changes in scope. Customer integration is addressed in the context supply chain integration having a dominant role in supply chain processes. Risk and scope were also selected as performance indicators in the first components matrix but these two components were omitted since performance more relies on meeting cost, schedule, quality, and safety objectives along with customer satisfaction. These two components were omitted after taking expert opinions and in-depth literature review. Table 1 presents the factor loadings for the latent and constituent variables of the model. Factor loadings for each factor prove that the all factors are well represented by their variables.

Table 1: Latent and constituent variables of the model

No	Model variables	Factor loadings
F_1	**Integration management**	
V_1	Development of project charter	0.737
V_2	Knowledge integration	0.813
V_3	Process integration	0.851
V_4	Staff integration	0.686
V_5	Supply chain integration	0.708
V_6	Integration of changes	0.763
F_2	**Project management performance**	
V_7	Time	0.855
V_8	Cost	0.729
V_9	Quality	0.808
V_{10}	Safety	0.755
V_{11}	Client satisfaction	0.983

The hypothesis regarding the relation between integration and performance was validated. This reveals the strong interaction between integration and performance. Integration is one of the most important components of successful project execution. Hence, the construction industry is still in great need of well-set practices and strategies. This study enlightens the critical role of integration management and poses its clear link with project management performance. Based on the clear link between integration management and project management performance, it is worth discussing the impact of individual components of integration management on project management performance.

Development of Project Charter: Project charter is the document that authorizes the start of a project. Therefore, it is critical to have the approval of the project charter on a timely manner. Provided with a high factor loading (0.737), project charter is undoubtedly one of the most important components of integration management affecting project success. PMI (2013) also implies the functionality of project charter in terms of describing project manager's authority. Considering the role of project managers in project management performance, one might conclude that projects managers are likely to achieve higher success in managing projects where a solid project charter exists including clear and proper description of authorities.

Knowledge Integration: Knowledge exchange among stakeholders and project parties is crucial in terms of project success. Heising (2012) also emphasizes that knowledge integration and ideation is essential in sustainable success. Several research studies mentioned the essential role of knowledge integration in project management performance (Schmickl and Kieser, 2008; Ritala and Hurmelinna-Laukkanen, 2009; Song and Song, 2010; Brettel et al., 2011; Too, 2012). Provided with a high factor loading (0.813), knowledge integration is concluded as a strong indicator of integration management. This leads to conclude that firms achieving success in knowledge integration have potential to perform better in their projects.

Process Integration: Organized sequence of project activities and logical relationships within processes frame process integration. Process integration may foster value creation when synthesized with human and task integration (Birkinshaw et al., 2000). The role of process integration in project management performance was also highlighted by several studies (Kleinschmidt et al., 2007). Provided with a high factor loading (0.851), process integration is dominant in terms of explaining integration management. It is undeniable that firms implementing effective process integration activities are likely to achieve better

performance in their projects. One might not discard the essential role of process integration in increased success.

Staff Integration: Project staff constitutes an important place in project management success. Therefore, integration of project staff, collaboration and coordination among them affect project management activities. It is reported that integration increases team work effectiveness (Egan, 2002). Therefore, composition of effectively working teams has a positive impact on project management performance. Reported with a high factor loading (0.686), staff integration should be addressed properly in terms experiencing higher levels of success. The necessity of staff integration as part of project management is underlined in several studies (Carmeli and Meyrav, 2009; Zajac, 2009; Jonas, 2010; Tiller, 2012).

Supply Chain Integration: Supply chain is in the critical chain of construction activities in terms of successful execution of projects. Its impact on project management is revealed in several studies (Gruner and Homburg, 2000; Henard and Szymanski, 2001). Provided with a high factor loading (0.708), supply chain integration is one of the core elements of integration management. The revealed link between integration and performance makes supply chain integration as one of the most important components to be addressed when firms desire to achieve higher rates of success.

Integration of Changes: Changes might create uncertainties in project management. Thus, timely handling of changes is essential to the success of a project. Integration of changes covers activities such as review and evaluation of change requests, modifications, and updates in project management plan. Research studies underlined that integration of changes is of utmost importance to experience better performance in managing projects (Hassner-Nahmias and Crawford, 2008; Cummings and Worley, 2009; Soderlund, 2010). Reported with a high factor loading (0.763), integration of changes becomes essential in integration management. This might be interpreted as firms should carefully address integration of changes when higher rates of success are desired.

CONCLUSION

This study investigates the relation between integration management and project management performance. In this perspective, a set of construction-specific components were proposed for integration and performance constructs. Data was collected from 121 projects through a questionnaire survey. SEM was used to validate the framework and test the hypothesis of a possible relation between integration and performance in addition to the potential impact of better integration management on improved project management performance. Findings of the study reveal that integration management has a considerable impact on project management performance, and it is suggested that this link is of considerable strength. When past studies are examined for the exposition of this link, it is indicated that there is a gap in the literature and the impact of integration management needs special emphasis. Hence, this study demonstrates the core component of integration management with its construction specific components and clearly visualizes the strong tie between integration and performance. With respect to the strong influence of integration management on the project management performance, it is essential that project managers effectively coordinate the processes and relevant parties. The proposed project management performance framework could be used by project managers in the construction industry to devise and implement effective strategies. It could be used to ensure project success prior to the start of a project, as well as a post project evaluation tool upon the completion of a project. The main limitations of this study are that the data was collected from Mashhad, Iran companies and it reflects their experiences and opinions, and the proposed strategies are recommended based on their needs. In this respect, data from different projects undertaken by different companies might result in varying findings. In addition, the research also has some limitations in that some of the performance measures are subjective measures, which were identified based on an extensive literature review and expert opinions. Different measures might affect the results of the study. Information regarding procurement methods of the project was not gathered in the questionnaire. Therefore, this appears as another limitation of the study since different procurement methods might affect integration management and in turn project management activities.

REFERENCES

Akanni, O.P., Oke, A.E., Akpomiemieb, A.O., (2015). Impact of environmental factors on building project performance in Delta State, Nigeria. HBRC J. 11 (1), 91–97.

Ali, M.A.E.H., Al-Sulaihi, A.I., Al-Gahtani, S.K., (2013). Indicators for measuring performance of building construction companies in Kingdom of Saudi Arabia. J. King Saud Univ. Eng. Sci. 25 (2), 125–134.

Aronson, Z.H., Shenhar, A.J., Patanakul, P., (2013). Managing the intangible aspects of a project: quantitative and qualitative evidence on the effect of vision, artifacts, and leader values on project spirit and success in technology driven projects. Proj. Manag. J. 44 (1), 35–58.

Asif, M., Fisscher, O.A.M., de Bruijn, E.J., Pagell, M., (2010). Integration of management systems: a methodology for operational excellence and strategic flexibility.

Badir, F.Y., Buchel, B., Tucci, L.C., (2012). A conceptual framework of the impact of NPD project team and leader empowerment on communication and performance: an alliance case context. Int. J. Proj. Manag. 30 (8), 914–926.

Bassioni, H.A., Price, A.D.F., Hassan, T.M., (2004). Performance measurement in construction. J. Manag. Eng. 20 (2), 42–50.

Berteaux, F., Javernick-Will, A., (2015). Adaptation and integration for multinational project-based organizations. J. Manag. Eng. 31 (6), 04015008.

Birkinshaw, J., Bresman, H., Hakanson, L., (2000). Managing The post-acquisition integration process: how the human integration and task integration processes interact to foster value creation. J. Manag. Stud. 37 (3), 395–425.

Brettel, M., Heinemann, F., Engelen, A., Neubauer, S., (2011). Cross-functional integration of R&D, marketing and manufacturing in radical and incremental product innovations and its effects on project effectiveness and efficiency. J. Prod. Innov. Manag. 28 (2), 251–269.

Carmeli, A., Meyrav, Y., (2009). How top management team behavioral integration and behavioral complexity enable organizational ambidexterity: the moderating role of contextual ambidexterity. Leadersh. Q. 20 (2), 207–218.

Cheng, E.W.L., Ryan, N., Kelly, S., (2012). Exploring the perceived influence of safety management practices on project performance in the construction industry. Saf. Sci. 50 (2), 363–369.

Crawford, C.B., (2005). Effects of transformational leadership and organizational position on knowledge management. J. Knowl. Manag. 9 (6), 6–16.

Cummings, T., Worley, C., (2009). Organization, Development and Change. South-Western Cengage Learning, Mason, OH.

Egan, J., (2002). Accelerating Change. Department of the Environment, Transport and the Regions, London.

Eriksson, P., Westerberg, M., (2011). Effects of cooperative procurement procedures on construction project performance: a conceptual framework. Int. J. Proj. Manag. 29 (2), 197–208.

Gayatri, V., Saurabh, K., (2013). Performance indicators for construction project. Int. J. Adv. Electr. Electron. Eng. 2 (1), 61–66.

Gruner, K.E., Homburg, C., (2000). Does customer interaction enhance new product success? J. Bus. Res. 49 (1), 1–14.

Halfawy, M., Froese, T., (2007). Component-based framework for implementing integrated architectural/engineering/construction project systems. J. Comput. Civ. Eng. 21 (6), 441–452.

Harper, C.M., (2014). Measuring Project Integration Using Relational Contract Theory. (Ph.D. dissertation). Univ. of Colorado at Boulder, Boulder, CO.

Hassner-Nahmias, A., Crawford, L.H., (2008). Project manager or change manager: who should be managing organizational change? Proceedings of the PMI Research Conference, Warsaw Poland. Project Management Institute, Newtown Square, Pennsylvania

Heising, W., (2012). The integration of ideation and project portfolio management - a key factor for sustainable success. Int. J. Proj. Manag. 30 (5), 582–595.

Henard, D.H., Szymanski, D.M., (2001). Why some new products are more successful than others. J. Mark. Res. 38 (3), 362–375.

Huang, J.C., Newell, S., (2003). Knowledge integration processes and dynamics within the context of cross-functional projects. Int. J. Proj. Manag. 21 (3), 167–176.

Hwang, G.B., Zhao, X., Toh, P.L., (2014). Risk management in small construction projects in Singapore: status, barriers and impact. Int. J. Proj. Manag. 32 (1), 116–124.

Jonas, D., (2010). Empowering project portfolio managers: how management involvement impacts project portfolio management performance. Int. J. Proj. Manag. 28 (8), 818–831.

Kagioglou, M., Cooper, R., Aouad, G., (2001). Performance management in construction: a conceptual framework. Constr. Manag. Econ. 19 (1), 85–95.

Kim, S., (2006). Effects of supply chain management practices, integration and competition capability on performance. Supply Chain Manag. Int. J. 11 (3), 241–248.
Kleinschmidt, E.J., De Brentani, U., Salomo, S.R., (2007). Performance of global new product development programs: a resource-based view. J. Prod. Innov. Manag. 24 (5), 419–441.
Mitchell, V., (2006). Knowledge integration and information technology project performance. Manag. Inf. Syst. Q. 30 (4), 919–939.
Mitropoulos, P., Tatum, C., (2000). Management-driven integration. J. Manag. Eng. 16 (1), 48–58.
Montabon, F., Sroufe, R., Narasimhan, R., (2007). An examination of corporate reporting, environmental management practices and firm performance. J. Oper. Manag. 25 (5), 998–1014.
Ngacho, C., Das, D., (2014). A performance evaluation framework of development projects: an empirical study of constituency development fund cumulative distribution function construction projects in Kenya. Int. J. Proj. Manag. 32 (3), 492–507.
Ospina-Alvarado, A., Castro-Lacouture, D., (2010). Interaction of processes and phases in project scheduling using BIM for A/E/C/FM integration. Proceedings of Construction Research Congress, (2010, pp. 939–948 (Alberto, Canada).
Ospina-Alvarado, A., Castro-Lacouture, D., Robert, J.S., (2016). Unified framework for construction project integration. J. Constr. Eng. Manag. 142 (7), 04016019.
Ozorhon, B., Abbott, C., Aouad, G., (2014). Integration and leadership as enablers of innovation in construction: case study. J. Manag. Eng. 30 (2), 256–263.
PMI, (2013). A Guide to the Project Management Body of Knowledge. Project Management Institute, Newtown Square, PA.
Popaitoon, S., Siengthai, S., (2014). The moderating effect of human resource management practices on the relationship between knowledge absorptive capacity and project performance in project-oriented companies. Int. J. Proj. Manag. 32 (6), 908–920.
Rad, P.F., (2003). Project success attributes. Cost Eng. 45 (4), 23–29.
Rahman, M., Kumaraswamy, M., (2004. Contracting relationship trends and transitions. J. Manag. Eng. 20 (4), 147–161.
Ritala, P., Hurmelinna-Laukkanen, P., (2009). What's in it for me? Creating and appropriating value in innovation-related coopetition. Technovation 29 (12), 819–828.
Salazar-Aramayo, J., da-Silveira, R., de Almeida, R.M., de Castro-Dantas, T., (2013). A conceptual model for project management of exploration and production in the oil and gas industry: the case of a Brazilian company. Int. J. Proj. Manag. 31 (4), 589–601.
Saraf, N., Langdon, C.S., Gosain, S., (2007). IS application capabilities and relational value in interfirm partnerships. Inf. Syst. Res. 18 (3), 320–339.
Schmickl, C., Kieser, A., (2008). How much do specialists have to learn from each other when they jointly develop radical product innovations? Res. Policy 37 (6/7), 1148–1163.
Soderlund, J., (2010). Pluralism in project management: navigating the crossroads of specialization and fragmentation. Int. J. Manag. Rev. 13 (2), 153–176.
Song, L.Z., Song, M., (2010). The role of information technologies in enhancing R&D-marketing integration: an empirical investigation. J. Prod. Innov. Manag. 27 (3), 382–401.
Takim, R., Akintoye, A., (2002). Performance indicators for successful construction project performance. Proceedings of 18th Annual ARCOM Conference, 2–4 September, University of North Umbria. Association of Researchers in Construction Management. vol. 2, pp. 545–555.
Tiller, S., (2012). Organizational structure and management systems. Leadersh. Manag. Eng. 12 (1), 20–23.
Too, E.G., (2012). Capability model to improve infrastructure asset performance. J. Constr. Eng. Manag. 138 (7), 885–896.
Vickery, S., Jayaram, J., Droge, C., Calantone, R., (2003). The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships. J. Oper. Manag. 21 (5), 523–539.
Zajac, C., (2009). Barriers to cultural and organizational integration in international holding groups - nature, scope and remedial measures. J. Int. Manag. 1 (2), 50–58.

THE ROLE OF ENTREPRENEURSHIP IN NEW BUSINESS CONDITIONS

Dragan Ćoćkalo
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
Dejan Đorđević
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
Mihalj Bakator
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
E-mail: mihalj.bakator@uns.ac.rs
Sanja Stanisavljev
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
Milan Nikolić
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
Edit Terek Stojanović
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia

ABSTRACT

The globalized economy brought challenges to companies and countries across industries. As competitive relations intensify, the achieving competitiveness is a struggle for the majority of enterprises. The new conditions that define the modern business environment are affected by the global economic crisis, the coronavirus pandemic, and the rapid development of modern ICTs. In such conditions, companies have to address new business models. From here, entrepreneurship presents an impactful way of increasing competitiveness of companies, which further can increase national competitiveness. In this paper, the entrepreneurship economy model is discussed. In addition, the underlying mechanisms of Society 5.0 are analyzed. The paper presents a model of domestic entrepreneurial economy development levels and elaborates on which level requires what kind of improvements. This way, a significant insight into the potential of the domestic entrepreneurial economy is provided.

Key words: Entrepreneurship, Society 5.0, Organization, Business, Competitiveness.

INTRODUCTION

The globalization of economy is the reality of the modern world. Globalization has led to an increase in the number of competitors on the international market, which affects the intensification of competitive relations. On the global market, enterprises face numerous challenges on a daily basis. These challenges are related to establishing an adequate competitive advantage. Competitiveness on the global market is based not only on innovation, but also on the price component and standardized product quality. The global economic crisis has pointed to the fact that it is necessary to create new business models. Market turbulence has become a new business reality. Today, business is taking place within the framework of the fourth technological revolution - Industry 4.0 (Bakator et al., 2019). Transformations on the market are changing the way individuals, governments and enterprises establish relationships with each other. Advanced information-communication technologies (ICTs) that characterize Industry 4.0 significantly contribute to the globalization of the economy, and presents one of the main sources of dynamic changes (Fukuda, 2019). On a global level, guidelines for sustainable development are defined, which should establish a balance between the goals of economic development and social development, taking into account the need for improvement and protection of the environment.

Furthermore, the crisis caused by the COVID-19 pandemic during 2020 and 2021 pointed to the need to change and improve the business philosophy of modern business organizations. The global economy has

shown fragility in the face of border closures, declining trade volumes and almost complete cessation of some business sectors such as global tourism and transport. According to Ferguson (CNBC, 2021), the pandemic makes the world divided, undermining globalization and multilateral institutions. The crisis caused by the global pandemic could not have been predicted, which will affect the fact that its negative effects will be greater in the future. Industrial nations have to deal with dangerous economic mega-trends including rising energy and raw material prices (this trend will continue in the coming years despite some fluctuations, because newly industrialized countries require resources for their own development), rising prices of higher-end industrial product finalization, which will further affect the decline in the purchasing power of industrialized countries.

On the other hand, further progress can be seen in the newly industrialized countries, primarily China, but also India. These countries have based their development on a strong entrepreneurial commitment. The economic center of the world is moving towards the Pacific. Today, it is obvious that the leader of the Pacific region is China and that the main axis of cooperation in the world is China-USA. The biggest trade is on both sides of the Pacific. The Shanghai region and Southern California are at the center of economic attention in the global economy. The experiences of the countries of this region indicate the importance of the nation's entrepreneurial determination.

The modern economy is turning to digital transformation. Digital transformation is changing the way we think about competition, and it changes the mechanisms through which innovations are introduced in business strategies. This also affects and changes the way of thinking when it comes to creating value for the client.

In this paper, the aim is to present a model of potential domestic entrepreneurial economy development levels. The various requirements of improvement translate into different levels of potential development. This way a concise and significant overview on the potential of the domestic entrepreneurial economy development is obtained. The paper consists of four main sections (excluding the Introduction and Conclusion sections). The first section address current trends in entrepreneurship. Next, entrepreneurship and Society 5.0 is analyzed. The third section discusses entrepreneurship in Serbia, and presents the entrepreneurial development model. Finally, suggestions and guidelines for improving and developing an entrepreneurial economy are discussed.

TRENDS IN ENTREPRENEURSHIP

The modern economy can be viewed as the economy of entrepreneurship. Private entrepreneurship is one of the central phenomena of the economy, along with the market economy and free competition. Entrepreneurial behavior is ubiquitous today in all forms of business and social life. In the economy of entrepreneurship, all individuals should behave entrepreneurially. Entrepreneurial behavior should be practiced regardless of employment status, meaning that self-employed, owners, or employees of an enterprise should think and act in an entrepreneurial manner. According to some understandings (Đorđević, & Ćoćkalo 2012), managing an enterprise is an entrepreneurial activity. Entrepreneurial behavior is a way of thinking, determined by a creative and innovative approach to business.

The development of entrepreneurship and entrepreneurial behavior became especially important in the early 1990s with the economic transformation of the socialist planned economies of Eastern Europe, as well as with the economic transformation of China. At the beginning of the eighties of the twentieth century, China opted for economic reforms, the center of which was entrepreneurship. The economy is opening up to small entrepreneurs who can sign contracts with foreign companies without permits. In practice, China is guided by Deng Xiaoping's famous maxim that "development is the only truth heard" and that "it doesn't matter if a cat is black or white as long as it hunts mice", which translated into plain language means: do whatever it takes to stimulate economic progress (Harari, 2018). Chinese President Xi Jinping (Jiping, 2019) believes that China has achieved development in a few decades, which developed countries took several centuries to achieve. This is the most amazing achievement in the history of the world.

Chinese entrepreneurs are among the best in the world, and the same can be said for most Far Eastern countries. Entrepreneurship development has been key to changing the economic behavior of both individuals and business organizations in all Central and Eastern European countries, China and Russia. The main role of entrepreneurship in the modern economy is reflected in innovative activities that create conditions for technological development, the formation of flexible organizations and new employment. Entrepreneurship, new technology and a strong state are key concepts for new and sustainable growth.

What is especially important is the fact that in the modern economy, an entrepreneur no longer has to be an individual who owns a business. An entrepreneur can also be an individual who is employed by an employer. According to Drucker (2003), business in an organization, regardless of size, must be managed in an entrepreneurial way, in order for a company to become an entrepreneurial organization. The corporate entrepreneurship model emphasizes teamwork and the members are motivated to work on achieving success and accepting risks. In the economy of entrepreneurship, all individuals should behave entrepreneurially. Additionally, all organizations, regardless of their activities and which type of industry they belong to, should also behave entrepreneurially and continuously apply the basic postulates of entrepreneurship. It is important to note that there are significant differences entrepreneurs/entrepreneurial actions and business owners/business owning. These differences are presented in Table 1.

Table 1: Differences between entrepreneurship and owning a small business

Approach/objective	Owner of a small business	Entrepreneur
Primary focus and motivation	Make a living/financial stability	Make an impact and promote change
Financial goal	Regular income and cash flow	Exit value of the enterprise
Career path objective	Self-employment	Financial freedom
Financing strategy	Own assets or bank loans	Investors
Business model and strategy	Creating more sales and revenue	Creating and providing value
Asset focus	Real estate and inventory	Customers and employees
Aversion to risk taking	Focus on stability	Preparedness and willingness to fail
Employee compensation	Market rate or less	Willing to pay for top talent
Work flow and work environment	Extension of owner's residence	Focus on fast-paced growth
Investment	Owner of the company	Involvement in different enterprises
Operational actions on a daily basis	Day to day planning	Growth, strategic collaboration
Work style	No changes long-term, repetitive	Short-term, lots of changes, innovations

(Source: Oražem, 2014)

Based on Table 1., it is evident that entrepreneurship differs from traditional business owning. This also indicates that simply owning a business doesn't necessarily drive innovation and economic prosperity on a larger scale. Further, companies must consciously and organize and apply the entrepreneurial concept and behave entrepreneurially, and to consciously embark on the process of innovation. The company must establish such a system of connections and relationships in the company that will allow focusing on entrepreneurial behavior. Entrepreneurial management is management focused on:

- constant development and change,
- creating and using opportunities for new business ventures,
- accepting risks in innovating business and improving business performance,
- finding new business potentials and opportunities,
- developing and implementing a strategy for constant change and innovation.

Furthermore, according to some analysis (2010), older people will work harder, due to shifts in the leading generations, as well as due to wider access to databases. Some governments have raised the retirement age, and on the other hand, low interest rates and the collapse of defined benefit pensions will mean that many people over the age of 65 will not have enough money to enjoy retirement benefits. This fact can change the way we do business, so more and more people can start working for themselves. The main weapon of

this group of people is experience, knowledge and networks of acquaintances, and they will probably have more time and money compared to younger entrepreneurs.

On the other hand, in the last ten years, in developed countries, especially in EU countries, more and more young people are deciding to start their own business and start entrepreneurship, especially in the service sector and IT sector.

ENTREPRENEURSHIP WITHIN THE FRAMEWORK OF SOCIETY 5.0

Modern society is moving towards a new phase of its development, which can be characterized as Society 5.0. The concept of Society 5.0 is based on science and technology, as well as key development factors. Tisen et al. (2006) believe that people live in a period of transition - the transition from the last days of the industrial economy to the first days of the knowledge economy. Society is moving from automated movement to automated knowledge. The service sector is becoming the main point to which attention is focused. Employment in that area is growing, while in every other industry it is declining.

Society 5.0 puts man at the center and tries to balance economic benefits with solving social problems. It includes a high degree of integration of physical and cyberspace. It is obvious that technology is the most important factor that enables the movement of society towards this phase of development. Technology is an essential factor in the development of the economy and society. In addition to technology, this society implies a high degree of creativity of each individual, primarily those who are employed or who are entrepreneurs. Organizations are based on knowledge and strive to constantly improve the productivity of knowledge.

Advanced technology is one of the main pillars of the competitiveness of the economy. The basis of advanced technology in science and the importance of research and development means the presence of a significant number of researchers and engineers, but also a highly skilled workforce in companies that develop and apply high technology. On the other hand, some authors, such as the famous British economic historian and Harvard professor Niall Ferguson (2016), believe that the achievements of the last twenty-five years were not so impressive, compared to what humanity achieved between 1935 and 1986. The speed of traveling has dropped since the time of the Concord, and green energy is expensive. More information and high volume information is not adequate for development.

The fifth industrial revolution - Industry 5.0 includes three elements: human focus, sustainability and resilience. Doing Business in Industry 5.0 will mean creating such business models that include the constant growth of business productivity and the creation of competitiveness, but also the need to create environmental and social value. From an economic aspect, this implies achieving profitability and scaling economies with business models that are socio-centric, while from an environmental aspect the aspect it implies sustainability (development of circular economy). In Table 2. the changes from Society 4.0 to Society 5.0 and its implications on entrepreneurship are presented.

Table 2: Changes from Society 4.0 and Society 5.0 and their implication on entrepreneurship

Society 4.0	Society 5.0	Entrepreneurship implication
Economies of scale	Problem solving and value creation	Focus on creating and providing value for customers
Uniformity	Diversity	Application of diverse abilities and development of skills
Concentration	Decentralization	Seizing opportunities and taking chances
Vulnerability	Resilience	Taking more chances with less overhead risk
High environmental impact	Sustainability	Focusing on change and green approaches

(Source: Hysa et al., 2021)

The changes that characterize Society 5.0 also affect the transformation of Industry 4.0 into Industry 5.0. The new business conditions dictate how entrepreneurship has to change in accordance with sustainability. Economies of scale have to transform into economies that drive value and sustainability. This further indicates the change towards an entrepreneurial economy.

ENTREPRENEURSHIP IN SERBIA AND ENTREPRENEURIAL ECONOMY

After the beginning of economic reforms in 2001, there was a process of economic transition. An essential part of the economic reforms after 2001 was the privatization and liberalization of economic relations, as was the case with the 1989 reforms. That is when there was a significant development of entrepreneurship on the Serbian market. During that period, it seemed that a new economic environment was being created that would enable fast and comprehensive development of entrepreneurship and entrepreneurial initiatives. With the beginning of the world economic crisis in 2008, there was a slowdown in entrepreneurial initiative and entrepreneurial activities in the domestic market.

What has always been dominant in the domestic economy (at least since the early 1990s until today) is the phenomenon that entrepreneurship is tied to real private capital, which is invested in the SME sector, and thus limited to less financial investments. Entrepreneurship has not been comprehensively treated as an opportunity for an entrepreneurial initiative of an individual to enable the emergence of large corporations, which will eventually become market leaders. In the domestic market, entrepreneurship was positively viewed only in the context of the development of small and medium enterprises and the ability of these companies to be shock absorbers for the transition recession - primarily viewed from the aspect of creating new jobs and employment.

Serbia inherited an incomplete market system (functioning of the goods / services market, without the existence of the labor market and the capital market), as well as a relatively fragmented model of ownership over economic entities (state, social, private and cooperative ownership), which coexisted but in unequal proportion). Additionally, the previous economic system had relatively little experience with private entrepreneurship, which is equally accessible to all interested individuals (1989-1992).

On the other hand, most of the capital is still in the hands of the state and the state is still the largest employer in the Republic of Serbia. Further, labor productivity in public companies is significantly lower compared to productivity in the private sector.

The turn of the domestic economy towards the development of information and communication technologies has in a way revived the entrepreneurial sector, which has been in stagnation since the world economic crisis. The opening of new, small companies in the domain of information technology significantly influenced the strengthening of the idea from an economic aspect that developing entrepreneurship is an imperative. On the other hand, too much was expected from this area of business on the domestic market. The group of small and medium enterprises on the domestic market is dominated by companies in the field of trade and classic services (traffic, construction), and the processing industry is dominated by the food industry, wood industry and machinery industry. The development of entrepreneurship in the conditions of the modern market and the transition of the economy and society towards the new phase of its development should be focused on the application of modern technological achievements in all areas of business and digitalization of business.

Entrepreneurship alone needs to be technology-oriented. IT start-ups are just one of the types of entrepreneurial activity, and the essence is to improve the technical and technological basis of business, especially in the group of small and medium enterprises. The entrepreneurial economy is different compared to the management economy, thus changes are necessary on multiple fronts. In Table 3. the differences between an entrepreneurial economy and a economies of scale are presented.

Table 3: Differences between entrepreneurial economies and economies of scale

Category	Economy of scale	Entrepreneurial economy
Underlying macro-factors	– Globalization of markets – Jobs and high wages	– Change – Localization
Business environment	– Specialization – Stability and status quo – Homogeneity	– Diversity – Turbulence – Heterogeneous
Way of conducting business	– Controlled – Competing or collaborating – Scaling business	– Market exchange – Motivation driven – Flexibility and adaptability
Government policies	– Output targeting – National locus – Constraining – Focus on output	– Local locus – Entrepreneurship support – Enabling – Focus on input

(Source: Kuura,2006; Moyle et al., 2020)

Furthermore, on Figure 1. the potential of domestic entrepreneurial economy development is presented.

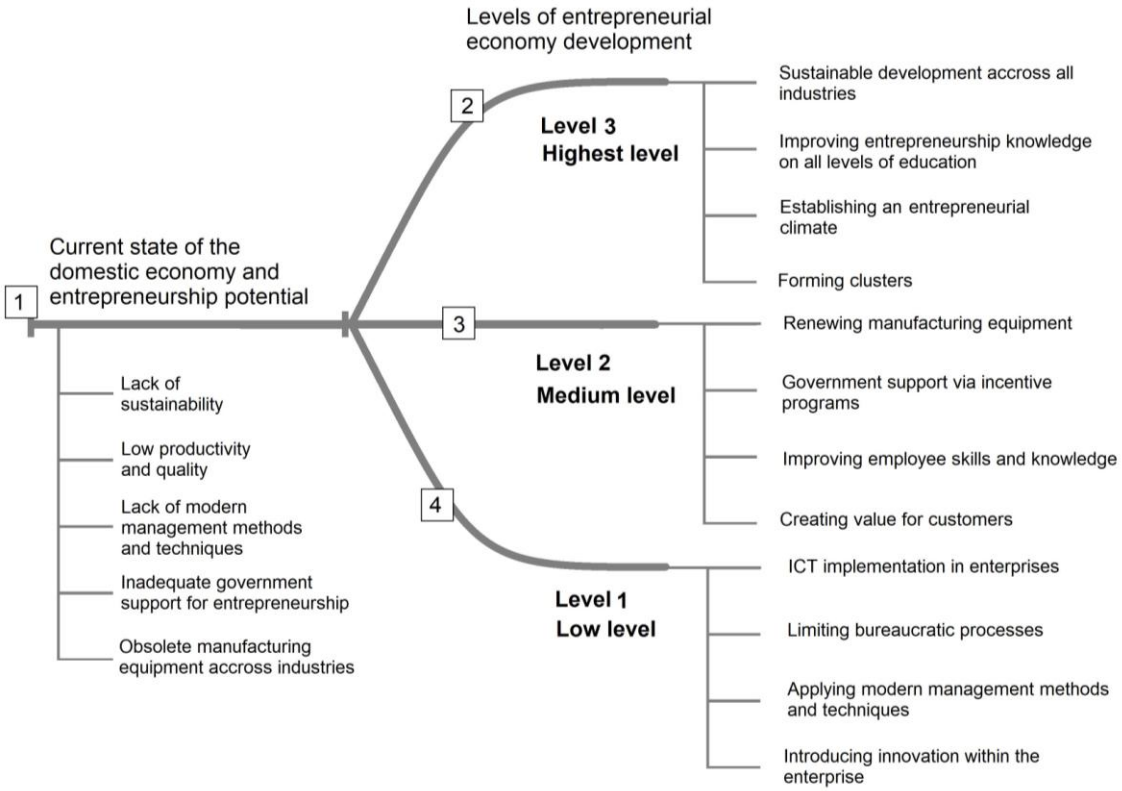


Figure 1: Potential levels of domestic entrepreneurial development (Source: Authors)

The presented potential levels of entrepreneurial economy development require improvements and changes in multiple domains. First (1), the current state of the domestic economy and its entrepreneurship potential are inadequate due to lack of sustainability, low productivity, low quality, lack of modern management practices, lack of adequate government support, and old manufacturing equipment. Next, the levels of entrepreneurial economy development depend on multiple factors and changes. These are not mutually-exclusive, and all factors within one level have to be addressed in order to go to the next level. Here, the lowest level (4) includes the implementation of ICTs, innovation, improved management practices, and more fluent bureaucratic processes. The next level (3) indicates the necessity for newer manufacturing equipment, strong government support, improving employees' knowledge and skills, and creating and providing value to customers and users. Finally, the highest level (2) of entrepreneurial economy

development includes systematic improvements such as sustainability, entrepreneurial education, entrepreneurial climate, and cluster formation between enterprises. The different levels of entrepreneurial economy development correspond to the size of entrepreneurial change which starts in a micro-setting (enterprise/entrepreneur) a expands to a macro-setting (national level entrepreneurship initiatives).

SUGGESTION AND GUIDELINES

Based on the discussed dynamics and importance of entrepreneurship, Society 5.0, and the overall new conditions of conducting business the following most important directions of action in the function of the development of an entrepreneurial economy are proposed:

- Limiting the operation of the bureaucratic apparatus, bureaucracy;
- Creating equal business conditions for all;
- Establishing an entrepreneurial climate on national economic level;
- Faster application of information and communication technologies within SMEs;
- Improving entrepreneurial knowledge and skills.

What many do not understand when it comes to the domestic economy is that entrepreneurship is not just a small business. An entrepreneur is equally an individual who owns a small business, as well as the owner of a small or large company. An entrepreneur is also a director who manages a private business on behalf of the owner of the capital. Entrepreneurship is a way of behaving in a market economy that is determined by innovation and risk-taking.

For the development of entrepreneurship at the level of one national economy, it is especially important to establish a stable economic situation (Ćoćkalo et al., 2020). Creating a secure political and economic situation gives security to potential entrepreneurs for their business, especially to domestic investors. Insufficient and stimulating business environment is the main reason for the involuntary development of entrepreneurship on the domestic market.

It is obvious that domestic managers, especially in SMEs, do not have modern knowledge and skills to successfully run their business organizations. In addition to the necessity for applying modern management methods and techniques, domestic entrepreneurs must improve various skillsets. According to the research of the World Economic Forum (WEF, 2020), critical thinking and solving business problems, creativity and adequate human resource management, as well as coordination, are certainly important skills that will be important in the future.

Overall, entrepreneurship is more than just conducting business. It involves the innovative actions that take resources and transform them into products and services, which further provides value to the customer. When the concept of sustainability is taken into consideration, then the process of obtaining and transforming resources has to be in accordance with the sustainable development goals. More precisely, economic goals have to be in balance with environmental aspects of conducting business.

CONCLUSION

The global market, the permanent development of technology, as well as the observed economic and social effects of the global pandemic, require a new approach to managing business systems, and a new approach for addressing behaviors between all individuals in the economic process. The experiences of companies that have managed to amortize the effects of the economic decline during 2020 and 2021, indicate the need for creative thinking in the function of problem solving, flexible market operations and good human resource management, etc.

It can be concluded that the speed of change in the global market affects the increasing importance of innovative action and flexibility in business. In that sense, entrepreneurship is today the basic model of behavior of all organizations, regardless of the nature of the activity. The development of entrepreneurship

in the modern market and the transition of the economy and society to a new phase of its development should be focused on the application of modern technological achievements in all areas of business. This also includes the digitalization of business, the application of modern management methods and skills, and entrepreneurs in the new society. For future research, it is recommended to collect survey data from enterprises to determine potential internal entrepreneurial intentions among employees. In addition, intentions regarding advanced ICT implementation, and sustainable business strategy adoption can be investigated.

ACKNOWLEDGEMENT

This paper has been supported by the Provincial Secretariat for Higher Education and Scientific Research of the Autonomous Province of Vojvodina, number: 142-451-2706/2021-01.

REFERENCES

Bakator, M., Đorđević, D., & Ćoćkalo, D. (2019). Developing a model for improving business and competitiveness of domestic enterprises. *Journal of Engineering Management and Competitiveness (JEMC), 9*(2), 87-96.

CNBC (2021). *2021 Outlook – The road to recovery*. www.cnbc./editorial 2021-outlook-the-road-to-recovery/#2021 outlook

Ćoćkalo, D., Đorđević, D., Bogetić, S., & Bakator, M. (2020). Youth entrepreneurship development: A review of literature and ten-year research results. *Journal of Engineering Management and Competitiveness (JEMC), 10*(2), 151-161.

Đorđević, D., & Ćoćkalo, D. (2012). *Businees planing* (In Serbian: Poslovno planiranje). Zrenjanin: TF Mihajlo Pupin.

Drucker P. (2003). *The Esential Drucker* (In Serbian: Moj pogled na menadžment*)*. Novi Sad: Adižes.

Ferguson N. (1996). *Great degeneration* (In Serbian: Velika degeneracija. Beograd: Plato

Fukuda, K. (2019). Science, Technology and Innovation Ecosystem Transformation Toward Society 5.0. *International Journal of Production Economics, 220*, S0925527319302701–. doi:10.1016/j.ijpe.2019.07.033

Harari, J.N. (2018). *Homo Deus*. Beograd: Laguna.

Hysa, B., Karasek, A., & Zdonek, I. (2021). Social Media Usage by Different Generations as a Tool for Sustainable Tourism Marketing in Society 5.0 Idea. *Sustainability, 13*(3), 1018. doi:10.3390/su13031018

Jiping, X. (2019). Narrating Chinas governance – Stories in Xi Jiping speeches (In Serbian: Priče i kazvianja). Beograd: Albatros Plus.

Kuura, A. (2006): Entrepreneurship Policy in Estonia. *Munich Personal RePEc Archive, 676*, 457-477.

Moyle, C., Moyle, B., Burgers, H. (2020). Entrepreneurial strategies and tourism industry growth. *Tourism Management Perspectives, 35*(2020), 100708. doi:10.1016/j.tmp.2020.100708

Novac (2010). *Inovacije koje će promeniti poslovanje*. Beograd: Ringier.

Oražem, B. (2014). *Value of IT service management for small and medium-sized enterprises leveraging cloud computing*. Northampton: University of Northampton.

Tisen, R., Andrisen, D., & Depre, F.L. (2006). *The knowledge dividend* (In Serbian: Dividenda znanja). Novi Sad: Asee books

World Economic Forum - WEF (2020). *Futures of Jobs Report 2020*. https://www.weforum.org/reports/the-future-of-jobs-report-2020

INNOVATIVE PROCESSES IN THE CONTEXT OF THE INSTITUTIONAL DYNAMICS OF THE RUSSIAN REGIONS

Larisa Nikitina
Voronezh State University, Russian Federation
E-mail: nikitina@econ.vsu.ru
Yuriy Treshchevskiy
Voronezh State University, Russian Federation
Anton Prachenko
Moscow State University of Sports and Tourism, Russian Federation
Sarkis Kazaryan
Voronezh State University, Russian Federation
Sergey Tolochko
Voronezh State University, Russian Federation

ABSTRACT

The paper is devoted to the identification of the state and trends of the effectiveness of innovation activity in the regions of Russia in relation to the parameters of the institutional environment. The methodology of the study includes cluster analysis, which made it possible to divide the regions of Russia into virtual clusters based on the results of innovation activity and six institutional indicators, as well as comparative analysis. The study uses official statistics data for 2005, 2010, 2015 and 2019. The results of using cluster analysis testify to the high mobility of the institutional environment in the Russian regions. As a result, there are three groups in the Russian regions: stable leaders, unstable leaders, outsiders. Each group of regions has its own combination of institutional indicators. It is noted that high results of innovative activity can be achieved at the expense of resources brought into the region, as evidenced by the abrupt increases and decreases in results in outsider regions.

Key words: Innovation activity, Institutional environment, Interrelations, Innovation activity, Institutional environment.

INTRODUCTION

Innovative development is the dominant trend in global socio-economic processes. In Russia, this task was set at the government level in 2011, when the Strategy for Innovative Development of the Russian Federation for the period up to 2020 was adopted.

In the scientific literature, the relationship of economic growth, innovative development with the characteristics of the institutional environment has been studied for a long time, in particular, in the works of North (1990), North (2010), Weber (2016), Baudrillard & Jaspers (2014), Brennan & Buchanan (1986), Myrdal (1968), Galbraith (1973), Stiglitz (2012). In the Russian literature, the problems of interrelations between economic and institutional phenomena are studied in detail in the works of Auzan (2011).

Keynes (1978) quite definitely established the relationship between such institutional characteristics of society as the propensity to consume and the propensity to save, on the one hand, and the phases of the economic cycle, on the other. With regard to Russian conditions, conclusions about the quantitative dependences of institutional conditions and economic parameters of the country's regions are made in the works of Endovitsky et al. (2017), Kosobutskaya et al. (2020), Risin et al. (2017), Tabachnikova et al. (2017), Treshchevsky, Nikitina et al. (2017).

RESEARCH METHODS

The study used official statistical information on the regions of Russia. We define the target indicator "efficiency of innovative activity" as the share of innovative goods and services in their total volume. The advantages of this indicator are its realism, since goods and services are produced and recognized by the market as innovative.

In the system of institutional characteristics of regions, primary attention is paid to classical Keynesian institutions: the propensity to consume and the propensity to save. At the same time, we believe that Keynesian indicators can be detailed, since both consumption and saving have different forms. Therefore, we supplemented them with a propensity for innovation, which theoretically should be linked to the results of innovative activity. In addition, it is taken into account that savings can exist in various forms and be transformed depending on the economic situation and other circumstances. In this regard, additional categories have been introduced into circulation: propensity to monetize assets; propensity to materialize assets. In addition, it is necessary to keep in mind that savings, at least theoretically, are intended to be used for some purpose. Therefore, there must be an immobilization of savings and, accordingly, a tendency to immobilize them. The composition of indicators, their economic and institutional content, and methods of their calculation are presented in Table 1.

Table 1: Content and methods of calculating indicators

Institutional and Economic content of indicators	**Calculation of the indicator**
Propensity to consume	The share of cash income used to purchase goods and services (%)
Propensity to save	The share of growth in financial assets in income (%). Only those regions are taken into account where the values of the growth of financial assets have a positive value. For regions with negative values, the values "0" (zero) are accepted, that is, there is no propensity to save.
Propensity to monetize assets	The share of the growth in cash that has a positive value (%). Only those regions are taken into account where the values of the growth of funds have a positive value. For regions with negative values, the values "0" (zero) are accepted, that is, there is no propensity to monetize.
Propensity to immobilize savings	The share of decrease in financial assets in income (%). Only those regions are taken into account where the values of the growth of financial assets have a negative value. For regions with positive values, the values "0" (zero) are accepted, that is, there is no tendency to immobilize assets.
Propensity to materialize assets	The share of income directed to the acquisition of real estate (%)
Propensity to innovate	Advanced manufacturing technologies used (units)
Effectiveness of innovation	The share of innovative goods and services in total volume of shipped goods and services (%)

The official statistics data (Regions of Russia, 2020) were used for calculations. Three groups of regions are excluded from the calculations: 1) Moscow and St. Petersburg (because of their radical differences from other regions of the country); 2) regions that are part of larger ones (to avoid double counting); 3) regions for which there is no complete information for the analyzed period. Therefore, only 70 regions are included in the final information array.

The following years were taken for analysis: 2005 (a period of high economic conjuncture); 2010 (post-crisis period); 2015 (crisis year); 2019 (a period of low economic conditions). Various methods of data processing were used for the analysis. At the first stage, an attempt was made to group the regions of the country based on cluster analysis developed by Hartigan & Wong (1979) and a number of other researchers. The method has received good approbation in the works of Russian researchers (Treshchevsky, Kosobutskaya et al., 2021, Treshchevsky, Papin et al., 2018).

As a result of the analysis, five virtual clusters were formed, differing in the nature, level of innovation activity, and combination of institutional parameters presented in Table 1. The information array turned out to be sufficient for the analysis. Statistical characteristics (F-test and p-values) of the obtained virtual clusters showed high significance and reliability of the average values.

Nevertheless, the possibilities of cluster analysis in this case turned out to be limited due to the strong spatial and functional changes of clusters at each time point. During the entire analyzed period, no core was formed in any of the clusters – a group of regions included in the same cluster at any time period. Usually, when analyzing socio-economic (including innovative) indicators of regions, such cores are formed. In such cases, it is convenient to use data from model regions representing the corresponding clusters. In this case, we are deprived of such an opportunity. However, the absence of cluster cores is important for conclusions about the state of innovation activity and the institutional environment of the regions. It shows that the institutional environment, contrary to popular belief, is very mobile not only in the long term, but even in the short term. A comparative method was used for further analysis. Regions with different levels of innovation performance were selected for comparison.

RESULTS AND DISCUSSION

Taking into account the generally low level of innovative activity of the regions, we have adopted a conditional level - the share of innovative goods and services in total volume of shipped goods and services is 10% or more at various time points. Upon reaching this level in each analyzed year, we consider the region to be in the group of “stable leaders”. Three regions reached 10% or more in three time points out of four, they were called "unstable leaders". To compare with their results, we have identified three regions that differ in the smallest values of the share of innovative goods and services in total volume of shipped goods and services. They are designated as "outsiders". Data on the effectiveness of innovations and the propensity to innovate are presented in Table 2.

Table 2: Effectiveness of innovations and Propensity to innovate in the Russian regions

Russian region	**Effectiveness of innovations**				**Propensity to innovate**			
	2005	2010	2015	2019	2005	2010	2015	2019
Stable leaders								
Republic of Mordovia	13,1	23,1	27,0	23,8	1233	2627	2925	2595
Republic of Tatarstan	16,5	15,6	20,4	18,1	1999	4076	6675	8304
Ulyanovsk Region	12,2	17,6	13,2	11,0	1267	1488	1821	2081
Unstable leaders								
Perm Region	20,9	10,9	7,7	12,0	3843	5182	4764	13690
Nizhny Novgorod Region	5,7	10,2	15,8	13,7	18812	14637	11632	8639
Samara Region	25,4	14,2	19,1	9,3	4727	6189	8630	8037
Outsiders								
Republic of Kalmykia	0,0	0,0	0,0	0,0	9	6	49	134
Kamchatka Region	0,0	0,1	0,3	1,2	95	171	312	720
Sakhalin Region	0,1	0,0	13,9	0,7	22	576	723	618
max	25,4	23,1	27,0	23,8	18812	14637	16467	18419
min	0,0	0,0	0,0	0,0	9	6	30	98

It follows from the data in Table 2 that the effectiveness of innovations can be based on resources brought in from the outside. Thus, the outsider – Sakhalin Region has dramatically increased the share of innovative goods and services since the unfavorable 2015. Then followed an equally sharp decline.

The propensity for innovation in "stable leaders" does not reach its maximum values, but grows throughout the analyzed period. In regions that are unstable leaders, there are multidirectional trends in both temporal and spatial aspects. At the same time, in general, the propensity for innovation in these regions is higher than in the "stable leaders". In outsider regions, the propensity for innovation is formally growing.

Calculations have shown that throughout the analyzed period, the propensity to immobilize assets in almost the entire information array is zero. There are only some exceptions to this rule in both temporal and spatial aspects. Table 3 presents data characterizing the propensity to consume and the propensity to save.

Table 3: Propensity to consume and Propensity to save in the Russian regions

Russian region	**Propensity to consume**				**Propensity to save**			
	2005	2010	2015	2019	2005	2010	2015	2019
Stable leaders								
Republic of Mordovia	58,7	58,2	67,2	76,1	31,6	29,7	16,7	8,0
Republic of Tatarstan	68,0	75,8	76,7	84,3	20,6	14,5	12,0	0,9
Ulyanovsk Region	74,8	67,1	71,7	81,1	14,3	20,2	15,4	5,1
Unstable leaders								
Perm Region	65,0	68,8	66,6	82,9	24,4	21,8	21,7	2,8
Nizhny Novgorod Region	71,4	70,0	72,1	82,0	18,1	19,3	16,4	4,9
Samara Region	80,2	71,6	77,9	85,4	9,7	19,4	8,8	0,0
Outsiders								
Republic of Kalmykia	60,3	49,7	56,9	61,0	29,1	38,4	27,3	24,2
Kamchatka Region	47,7	52,0	70,7	67,3	39,9	31,8	10,9	12,7
Sakhalin Region	59,5	71,0	74,1	77,7	27,7	15,5	10,4	4,4
max	88,6	84,4	94,1	93,7	39,9	38,4	27,3	24,2
min	47,7	49,7	56,9	61,0	0,0	7,2	0,0	0,0

With regard to the propensity to consume the following conclusions can be drawn:

- in the group of stable leaders, the values of indicators are in the same range as in the group of unstable leaders, while the general trend for leaders is a steady increase in the values of the indicator;
- in the group of unstable leaders, the values of indicators show less stable growth;
- both groups are characterized by exceeding the value of 80% in 2019; the exception is the Republic of Mordovia, where throughout the analyzed period the propensity to consume was significantly lower than in the other five leading regions;
- the group of outsiders are characterized by lower values of propensity to consume, however, there is a fairly steady increase in propensity to consume (with the exception of the Republic of Kalmykia).

The propensity to save varies as follows:

- in all groups of regions, two periods are quite clearly distinguished: 1) a high level of propensity to save in 2005-2010; 2) a decrease in the values of this indicator in 2015 and, especially, in 2019;
- in 2005, the highest values of the indicator were for outsider regions, and the lowest were for unstable leaders (while the Perm Region had higher values than a number of regions – stable leaders);
- in 2010, there were multidirectional trends in all groups of regions;
- 2015 and 2019 showed an almost unambiguous trend – a decrease in the values of the indicator (the exception is the Kamchatka Territory, in which there was an increase in 2019 compared to 2015;
- in 2019, outsider regions showed the highest values of propensity to save.

Let's turn to the remaining pair of indicators: propensity to monetize assets and propensity to materialize assets (Table 4). As can be seen from the data presented in Table 4, the propensity to monetize assets in groups of regions differs as follows:

- in the group of regions "stable leaders", the values of the indicator vary in a wide range both in temporal and spatial aspects; in general, there is a noticeable decrease in the propensity to monetize assets in 2015-2019;
- in the group of regions "unstable leaders", the values of the indicator are generally in the same range, but there are abrupt changes, especially pronounced in the Perm Krai and Samara region;
- in the group of regions "outsiders", the spatial and temporal fluctuations of the indicator values are the highest - from 0.0 to 24.6%; in 2005, the level of propensity to monetize assets is significantly higher than in other groups of regions; the general trend is a decrease in the propensity to monetize assets, nevertheless it is it remained at a higher level than the other groups of regions.

The propensity to materialize assets has the following trends:

- significantly lower value of the indicator in all groups of regions in relation to the maximum in the Russian Federation;
- in both groups of leading regions, the indicator values are generally higher than in the outsider group throughout the analyzed period;
- in the regions that are stable leaders, there is an increase in the propensity to materialize assets, in the regions that are unstable leaders, there is a decrease; in the outsider regions, the values of the indicator are growing, however, remain at a lower level than in the groups of leaders.

Table 4: Propensity to monetize assets and Propensity to materialize assets in the Russian regions

Russian region	**Propensity to monetize assets**				**Propensity to materialize assets**			
	2005	2010	2015	2019	2005	2010	2015	2019
Stable leaders								
Republic of Mordovia	17,4	13,7	10,0	8,7	0,8	3,4	2,1	2,1
Republic of Tatarstan	7,7	3,1	3,4	1,5	1,1	1,9	0,8	1,6
Ulyanovsk Region	5,1	9,0	7,0	6,3	1,5	4,6	1,5	1,3
Unstable leaders								
Perm Region	6,2	8,5	14,8	4,2	1,3	0,8	0,8	1,0
Nizhny Novgorod Region	2,5	5,9	7,9	4,1	1,7	1,2	0,7	0,8
Samara Region	0,0	8,1	0,0	0,4	2,3	1,0	0,8	1,1
Outsiders								
Republic of Kalmykia	24,6	31,0	10,1	8,4	0,4	1,0	0,9	0,9
Kamchatka Region	12,6	9,0	2,6	12,7	0,1	1,1	0,5	0,9
Sakhalin Region	12,6	0,0	2,5	3,7	0,2	1,5	1,0	0,9
max	30,9	31,0	14,8	15,3	8,0	11,4	4,6	6,0
min	0,0	0,0	0,0	0,0	0,1	0,1	0,2	0,3

CONCLUSION

There are three groups of Russian regions that differ significantly in the level of innovation results: stable leaders, unstable leaders, outsiders. The number of regions in the leading groups is insignificant - there are three regions in each group. The use of cluster analysis has shown that in the formed virtual clusters, built according to the results of innovation activity and six institutional indicators, there are no cores - groups of regions present in the same cluster at each time point. This indicates the high mobility of the institutional environment not only in the long term, but also even in the short term.

Each group of regions has its own combination of institutional indicators. The key characteristics of the selected groups of Russian regions were established using a comparative analysis. Stable leaders are characterized by:

- an increase in the propensity to innovate throughout the analyzed period with its lagging behind unstable leaders;
- high and unevenly growing propensity to consume;
- low and unevenly decreasing propensity to save;
- a wide range of values of the propensity to monetize assets with its uneven decline;
- the propensity to materialize assets is low, but higher than in outsider regions; during the analyzed period, the values of the indicator are growing.

Unstable leaders are characterized by:

- high level, but unstable dynamics of the propensity to innovate;
- high level, but unstable growth of propensity to consume;
- the lowest level of propensity to save among all groups; unstable, but pronounced decrease in the values of the indicator;
- a wide range of values of the propensity to monetize assets in the regions with its uneven decline;
- the propensity to materialize assets is low, but higher than in outsider regions; during the analyzed period, the values of the indicator decrease.

Outsider regions are characterized by:

- low, although increasing, level of propensity for innovation;
- low, although growing, values of propensity to consume;
- high values of the propensity to save with significant fluctuations in temporal and spatial aspects;
- high values of the propensity to monetize assets with a general decrease in its values;
- low, although growing, values of propensity to materialize assets.

REFERENCES

Auzan, A. (2011). *Institutional Economics: New Institutional Economic Theory.* Moscow: INFRA M.

Baudrillard, J., & Jaspers, K. (2014). *Phantom of the crowd*. Moscow: Algorithm.

Brennan, G., & Buchanan, J. (1986). *The Reason of Rules: Constitutional Political Economy*. Cambridge: Cambridge University Press. doi:10.1017/CBO9780511895937

Endovitsky, D., Tabachnikova, M., & Treshchevsky Y. (2017). Analysis of the Economic Optimism of the Institutional Groups and Socio-Economic Systems. *Journal of Advanced Research in Law and Economics, 8*(6), 1745-1752.

Galbraith, J.K. (1973). *Economics and the Public Purpose*. Boston: Houghton Mifflin Company.

Hartigan, J. & Wong, M. (1979). Algorithm AS 136: A k-Means Clustering Algorithm. *Journal of the Royal Statistical Society, Series C (Applied Statistics)*, 28, 100-108.

Keynes, J.M. (1978).*The General Theory of Employment, Interest, and Money*. Moscow: Progress.

Kosobutskaya, A., Nikitina, L., Tabachnikova, M., & Treshchevsky, Y. (2020). Advantages and Opportunities for the Development of Small Business E-Commerce in the B2B Sector. In: Elena G. Popkova, Bruno S. Sergi (eds) *Digital economy: Complexity and Variety vs Rationality.* Cham, Switzerland: Springer International Publishing AG, 524–531 doi: 10.1007/978-3-030-29586-8

Myrdal, G. (1968). *Asian Drama: An Inquiry into the Poverty of Nations*. New York: Pantheon Books, Twentieth Century Fund.

North, D. (1990). *Institutions, Institutional Change and Economic Performance* (Political Economy of Institutions and Decisions). Cambridge: Cambridge University Press. doi:10.1017/CBO9780511808678

North, D. (2010). *Understanding the Process of Economic Change* (The Princeton Economic History of the Western World, 32). Princeton: Princeton University Press.

On approval of the Strategy for Innovative Development of the Russian Federation for the period up to 2020. (2011). https://digital.gov.ru/ru/documents/3622/

Regions of Russia. (2020). *Socio-economic indicators*. Moscow: Rosstat.

Risin, I., Treshchevsky, Y., Tabachnikova, M., & Franovskaya, G. (2017). Public Authorities and Business on the Possibilities of Region's Development. In: Popkova E. (eds) *Overcoming Uncertainty of Institutional Environment as a Tool of Global Crisis Management. Contributions to Economics*. Cham, Switzerland: Springer International Publishing AG, 55-62. doi:10.1007/978-3-319-60696-5_8.

Stiglitz, J. (2012). *The Price of Inequality: How Today's Divided Society Endangers Our Future.* New York: W. W. Norton & Company.

Tabachnikova, M., Treshchevsky, Y., Frankovskay, G., Vertakova, Y., & Sogacheva O. (2017). Economic and Institutional Development of Russian Regions in the Context of the Global Socio&Economic Processes. *Globalization and its socio-economic consequences*. 17th International Scientific Conference. University of Zilina, The Faculty of Operation and Economics of Transport and Communications, Department of 4th – 5th October 2017. Rajecke Teplice, Slovak Republic. Part YI, 2642-2649.

Treshchevsky, Y., Kosobutskaya, A., Opoikova, E., & Tsebekova, E. (2021). Spatial and Functional Aspects of Russian Foreign Economic Activity: Paradigm Shift. *Proceedings of the 37th International Business Information Management Association (IBIMA)*, 30-31 May 2021, Cordoba, Spain, 9682-9691.

Treshchevsky, Y., Nikitina, L., Litovkin, M. & Mayorova, V. (2017). Results of Innovational Activities of Russian Regions in View of the Types of Economic Culture. In Popkova, E. (Ed.), *Russia and the European Union: Development and Perspectives. Part of the series: Contributions to Economics*. Cham, Switzerland: Springer International Publishing AG, 47-53. doi:10.1007/978-3-319-55257-6_7

Treshchevsky, Y., Papin, S., & Penina E. (2018). Structural Changes of the Consumer Market of Russia: from Post Crisis Development to the Sanctions Period. *Proceedings of the International Scientific Conference "Competitive, Sustainable and Secure Development of the Regional Economy: Response to Global Challenges" (CSSDRE 2018*), Atlantis Press, 449-452. doi: 10.2991/cssdre-18.2018.92.

Weber, Max. (2016). Economy and Society: Essays on Interpretive Sociology (an excerpt). *Journal of Economic Sociology*. 17. 13-29. doi:10.17323/1726-3247-2016-5-13-29.

RESEARCH ON THE IMPACT OF ETHICAL LEADERSHIP AND EFFECT OF WORK ON REDUCING TURNOVER

Dragana Sajfert
ITS Information Tehnology School, Belgrade, Serbia
E-mail: sdragana77@hotmail.com
Jesa Kreiner
California State University, Fullerton, Los Angeles, California, USA
Živorad Vasić
ITS Information Tehnology School, Belgrade, Serbia
Svetlana Anđelić
ITS Information Tehnology School, Belgrade, Serbia
Milorad Živković
International University of Brčko District of Bosnia and Herzegovina

ABSTRACT

This research aims to examine the impact of ethical leadership and the effects of work on turnover in companies in Serbia. A conceptual framework has been developed that integrates ethical leadership as an intermediary mechanism in explaining the link between ethical leadership, employee performance and reduced turnover. The proposed research was done using data collected from a sample (n = 96) of companies in Serbia. The results of the research reveal to us that ethical leadership has a positive effect with the performance of employees, while at the same time increasing their intention not to leave the job. This study clarifies that, in companies in Serbia, ethical leadership plays a key role in achieving performance goals and reducing turnover.

Key words: Ethical leadership, Job performance, Turnover intention, Satisfaction with comunikation.

INTRODUCTION

According to Sajfert, Đorđević, Bešić (2006) Fluctuation is the departure of employees from the organization and the arrival of new employees. Seifert (2004) states that the fluctuation of the labor force is the migration of human resources between companies, due to the departure of some and the arrival of other resources. Fluctuation is conditioned by economic-social and technical-technological factors. Seifert (2018) states in the research that their work presents the results of research on the impact of ethical leadership behavior on certain individual and organizational effects in Serbian companies. Thomas et. al. (2004) state in their paper that ethical leadership is imperative for organizations because it helps them reduce business costs through fair and moral treatment of their employees as well as other resources. Authors Piccolo et. al. (2010), Walumbwa et al. (2011), Walumbwa et. al. (2012) state that relatively less attention has been paid to examining the relationship between ethical leadership, employee performance, and their intention to leave an organization. Alkavia (2017) states that a significant amount of research indicates that fluctuation is mainly the result of a negative relationship between leaders and managers in the workplace and their followers. Authors Wang and Yang (2016), Brown, Treviño, and Harrison, (2005) state that scientists pay little attention to the interconnectedness of ethical leadership, employee performance, and employee turnover. Wayne and Green (1993) point out that ethical leaders also emphasize two-way communication with employees, so employees feel more responsible and make extra efforts to do their job well. Ahn et. al. (2018) suggest in the paper that employees work harder and try to return with their improved performance.

LITERATURE REVIEW

In their study, Demitras and Akdogan (2015) examine a mediated model of ethical leadership, intent for change, and affective commitment. The results obtained by Demitras and Akdogan (2015) show that ethical leadership has both direct and indirect effects on affective commitment and intention to change. In their study, Shareef and Atan (2018) aimed to examine the effect of ethical leadership on followers 'organizational civic behavior (OCB) and intent for change, and to examine the mediating role of intrinsic motivation in relationships. A study by Shareef and Atan (2018) came up with results that showed that ethical leadership is positively associated with OCB, and in part with intentions for change.

This refers primarily to the works of Ciulla (1998), Heifetz (1994). In their works, five principles of ethical leadership are presented: respect, helpfulness, fairness, honesty and togetherness. According to Brown, et. al. (2005) increased research on the impact of ethical leadership on followers' attitudes toward communication satisfaction. Ciulla (2001) explores ethical issues of leadership in a variety of contexts, including, business, NGOs, and government. It integrates material on ethics and leadership from great Eastern and Western philosophers with leadership literature and case studies. This multidisciplinary approach of Ciulla (2001) helps to present ethical leadership as a fully integrated view of ethics with the help of philosophers and scientists.

Johnson and Ridley (2008) conducted research on the most important and concise truths for a leader in all areas, including issues of integrity, loyalty, fairness, respect, and delivery in a business environment. An interesting study of ethical leadership was done by Chan et. al. (2016) which emerged as an important topic related to understanding the effects of leadership within an organization. Chan et. al. (2016) believe that leaders must demonstrate ethical behavior in order to set high moral standards and encourage ethical behavior of followers toward growth. Research conducted by the Principles of Ethical Behavior of Leaders has a positive effect on the attitudes of employees, but also on the ethical behavior of employees themselves (Kalshoven, Den Hartog, 2009; Brown et al., 2005; Trevino, Brown, Hartman, 2003). In addition, ethical leaders use power in a socially responsible way and view leadership as a process that affects employee social responsibility (De Hoogh, Den Hartog, 2008). According to Hollander (1995), the principles of ethical leadership are among the essential elements for the development of loyalty and trust in the cooperation of leaders and followers. Palanski et. al. (2014) state that unlike ethical leadership, which does not lead directly to job search, violent surveillance can also directly hinder people from initiating job search behavior. Their findings show that even a low level of abuse can neutralize a high level of ethical leadership.

Holtom et. al. (2008) conducted extensive research on the topic of voluntary employee turnover in the past decade. Holtom et. al. (2008) developed new managerial approaches to employee retention, labor market dynamics, and the evolution of research methodology and technology. Elci et. al. (2012) in their paper state that the determinants of employee turnover have a significant impact on the performance of the organization and that they have been extensively studied. Elci et. al. (2012) with this study sought to understand the effects of ethical leadership and the effectiveness of employee intention to fluctuate.

METODOLOGY

Hypothesis

H1: Ethical leadership has a positive impact on employee performance.
H2: Ethical leadership has a positive relationship with employee intentions about turnover.
H3: Performance has a positive relationship with employee turnover intentions.

Sample

The research, which dealt with the impact of ethical leadership and the effects of work on employee turnover in Serbia, was conducted during 2020-2021. The research that included the analysis included

95 respondents from different companies. Data collection was done through surveys of respondents, but also through personal interviews. Respondents filled out a methodologically creative questionnaire in advance, the answers to which formed the necessary database, whose further data processing led to the necessary conclusions and future directions in this research.

Research Instruments

A 10-point scale, adapted from Brown, Treviño, and Harrison, (2005), was used to measure ethical leadership on the Likert (1932) 5-point scale ranging from 1 - Strongly Disagree to 5 - Strongly Agree. The items were based on the experience of employees as they feel about their leaders and the extent to which their leaders care about them and involve them in the decision-making process. Elçi, et. al (2012), O'Reilly, et. al. (1991), Rosin, and Korabik, (1991) was used to measure Intentional employee turnover was measured using the Likert (1932) 5-point scale ranging from 1 - Strongly Disagree to 5 - Strongly Agree .. Scale of 14 item was adapted to Lynch, Eisenberger and Armelia (1999) to measure performance using the Likert (1932) 5-point scale ranging from 1 - Strongly disagree to 5 - Strongly agree.

Research goals

The aim of this study is to examine the impact of ethical leadership and the effects of work on reducing turnover. Ethical leadership and the effects of dada play an important role in anticipating and reducing turnover. One could even say that work engagement mediates the relationship between ethical leaders and employee turnover. The aim of the research is to discover the leadership approach and the effects of work that involve employees, and in that way the turnover in the company is reduced.

RESULTS

Reliability

The items were based on the experience of employees as they feel about their leaders and the extent to which their leaders care about them and involve them in the decision-making process. The Cronbach's alpha value shows a high internal consistency of the ethical leadership scale ($\alpha = 0.902$). The Cronbach's Alpha value shows a high internal consistency of the scale for job performance ($\alpha = 0.942$). The Cronbach's alpha value shows a high internal consistency of the scale for the intention of fluctuation ($\alpha = 0.935$).

Corelation analysis

Correlation analysis (influence of ethical behavior of leadership and the effect of work on reducing turnover). Table 1 shows the results of the correlation analysis between the dimensions of ethical behavior of leaders and the dimensions of work effects and the dimensions of fluctuation reduction.
First, confirmatory factor analysis (CFA) was used to verify factor loads, validity, and reliability as shown in Table 1. The factor loads of all indicators are greater than or equal to 0.50, and significant at least at 0.05. The findings suggest that the instrument of this study successfully crossed the threshold of convergent validity criteria.

Discriminant validity is checked by comparing the square roots of the extracted average variances (AVEs) with the corresponding correlation between constructions. The square roots of AVE for latent constructs are given in Table 2.

It was observed that the values of the square roots of AVE for each latent construct are greater than the values of any correlation of the corresponding latent construct. Therefore, it is concluded that the measurement model has satisfactory discriminant validity. The reliability of measurement models is

assessed using Cronbach's alpha (CA) and structural reliability (CR). The acceptability level of CA and CR is greater than 0.70. CR and CA values also confirm that the constructions are reliable. The findings reveal that the model meets widely accepted data validation criteria and recommend that SEM-PLS findings can be trusted and have no problems measuring data.

Table 1: Factor loads, validity and reliability

Items	**EL**	**TI**	**JP**
EL1 (ethical leadership)	0,712		
EL2	0,732		
EL3	0,896		
EL4	0,865		
EL5	0,835		
EL6	0,876		
EL6	0,832		
EL7	0,821		
EL8	0,967		
EL9	0,754		
EL10	0,812		
TI1 Turnover intention		0,943	
TI2		0,932	
TI3		0,963	
TI4		0,975	
TI5		0,979	
TI6		0,943	
JP1 (performance measurement)			0,765
JP2			0,786
JP3			0,756
JP4			0,734
JP5			0,843
JP6			0,776
JP7			0,727
JP8			0,712
JP9			0,735
JP10			0,747
JP11			0,783
JP12			0,774
JP13			0,767
JP14			0,786
CR	0,923	0,879	0,923
CA	0,913	0,854	0,931
AVE	0,545	0,589	0,503
Skewness	-0,767	0,297	-1,121
Kurtosis	0,132	-0,765	2,211

Table 2: Descriptive Statistics.

Variable	**N**	**Min**	**Max**	**Mean**	**SD**	**Crombach alpha**
1 Ethical leadership	95	1.00	5.00	3,7760	0,86437	.902
2 Job performance	95	1.00	5.00	4,4530	0,72320	.935
3 Turnover intention	95	1.00	5.00	2,8976	1,32180	.942

Table 2 shows the mean values, standard deviations, and correlations of the variables. Low and medium level correlations confirm the absence of collinearity between indicators. The table gives, among other things, the names of items and dimensions, a short name for each item or dimension, mean values and standard values, as well as Cronbach's Alpha for each dimension. Cronbach's Alpha values range from $\alpha = .899$ to $\alpha = .942$

Based on the results, it can be seen that all correlations between the dimensions of ethical leadership and the dimensions of employee performance are positive and statistically significant (This, in a broader sense, confirms hypothesis H1). Based on the results, it can be concluded that the correlation

between the dimensions of ethical leadership and employee intentions on turnover has a positive relationship and statistical significance (This, in a broader sense, confirms hypothesis H2). Based on the results, it can be seen that all correlations between the dimensions of work performance and the dimensions of employee intentions, positive and statistically significant (This, in a broader sense, confirmed hypothesis H3).

Table 3: Hypotheses testing

Path	Direct	Indirect	Total
EL - JS	0,476***		0,476***
EL - JP	0,143***	0,324***	0,467***
JS - TI	0,178		0,178

** statistically significant at 10%
*** statistically significant at 1%

DISCUSION

Previous studies have highlighted the importance of leadership in terms of employee performance and intent to fluctuate. However, relatively limited attention has been paid to understanding the underlying mechanisms through which ethical leaders influence employees to achieve desired and / or desired performance results. This study responds to calls that seek to investigate the relationship between ethical leadership and employee performance through a mechanism to reduce turnover. This study differs significantly from other research that only focused on the relationship between leaders and employees as the main mechanism in elucidating the influential role of ethical leadership in shaping employee performance and intentions to leave organizations. In short, the results of this study propagate that ethical leadership can boost employee performance and reduce their intention to fluctuate.

CONCLUSION

The main purpose of this study was to excavate our understanding of the relationship between ethical leadership, performance, and employee turnover in Serbia. The data were collected from Serbia, which has a vital role in the Balkans. If we compare Western theories and analyze the results obtained in non-Western contexts, scientists and experts would have firm certainty about the wide applicability of these theories to other parts of the world.

This research provides a better understanding of the applicability of ethical leadership, performance and intent to fluctuate in Serbia. However, this research is just a small grain of sand in the sea, we expect that it will motivate other researchers to seek to spread the insight of these concepts in other countries.

REFERENCES

Ahn, J.; Lee, S. and Yun, S. (2018) Leaders' core self-evaluation, ethical leadership, and employees' job performance: The moderating role of employees' exchange ideology. Journal of Business Ethics 148(2), 457-470.

Avey, J. B.; Wernsing, T. S. and Palanski, M. E. (2012) Exploring the process of ethical leadership: The mediating role of employee voice and psychological ownership. Journal of Business Ethics 107(1), 21-34.

Brown, M. E.; Treviño, L. K. and Harrison, D. A. (2005) Ethical leadership: A social learning perspective for construct development and testing. Organizational Behavior and Human Decision Processes 97(2), 117-134.

Chan, K. C., Fung, A., Fung, H. G., & Yau, J. (2016). A Citation Analysis of Business Ethics Research: A Global Perspective, DOI:10.1007/s10551-014-2533-9. *Journal of Business Ethics*. 136, 557-573.

Ciulla, Joane, B. (1998). Ethics: The Heart of Leadership, ISBN-13: 9780275961206, Westport, CT: *Grenwood* Publisher Group, Incorporated.

Ciulla, Joane, B. (2001). Carving Leaders From the Warped Wood of Humanity, Canadian Journal of Administrative Sciences, *Revie canadienne des sciences de l administration*, 18(4), 313-319.

De Hoogh, A. H. B., & Den Hartog, D. N. (2008). Ethical and despotic leadership, relationship with leaders social responsibility, top management team effectiveness and subordinates optimism: A multy.method study. *Leadership Quarterly*, 19, 297-311.

Demitras Ozgur, Akdogan Asuman (2015) The Effect of Ethical Leadership Behavior onEthical Climate, Turnover Intention, and Affective Commitment, Journal of Businness Ethics, 130, 59-67.

Elçi, M., Şener, İ., Aksoy, S. and Alpkan, L. (2012) The impact of ethical leadership and leadership effectiveness on employees' turnover intention: The mediating role of work related stress. Procedia-Social and Behavioral Sciences 58, 289-297.

Heifetz, R. A. (1994). Leadership Without Easy Answers. Cambridge, MA: *Harvard University Press.*

Holander, E. P. (1995). Ethical Challenges in the Leader-Follower Relationship, *Business Ethics Quarterly*, 1, (55-65).

Holtom, B. C., Mitchel, T. R., Lee, T. W., and Eberly, M. B. (2008) Turnover and Retention Research: A Glance at the Past, a Closer Review of the Present, and a Venture into thw Future. Academy of Management, 2(1), 231-274.

Johnson, Brad, W., Ridley, & Charles R. (2008) The Elements of Ehics, for profesionals, St. Martins Press. Palgrave Macmillan, Unitrd States-a division of St. Matrin's Press, LLC, New York, ISBN 0-230-60391-2

Kalshoven, K., & Den Hartog, D. N. (2009). Ethical Leader Behavior and Leader Effectiveness: The Role of Prototypicality and Trust. *International Journal of Leadership Studies*. 5(2), 102–119.Katz, D. and Kahn, R.L. (1967) The social psychology of organizations. John Wiley & Sons, 1967.

Likert Rensis (1932).Technique for the Measurement of Attitudes, Archives of Psichology, 140, 1-55.

Lynch, P.D., Eisenberger, R. and Armeli, S. (1999) Perceived organizational support: Inferior versus superior performance by wary employees. Journal of Applied Psychology 84(4), 467-483.

O'Reilly, C.A.; Chatman, J. and Caldwell, D.F. (1991) People and organizational culture: A profile comparison approach to assessing person-organization fit. Academy of Management Journal 34(3), 487-516.

Palanski Michael, Avey James and Jiraporn Napatsorm (2014) The Effects of Ethical Leadership and Abusive Supervision on Job Search Behaviors in the Turnover Process, Journal of Business Ethics, 121(1), 135-146.

Piccolo, R. F., Greenbaum, R., den Hartog, D. N. and Folger, R. (2010) The relationship between ethical leadership and core job characteristics. Journal of Organizational Behavior 31(2-3), 259-278.

Rosin, H.M. and Korabik, K. (1991) Workplace variables, affective responses, and intention to leave among women managers. Journal of Occupational and Organizational Psychology 64(4), 317-330.

Sajfert Z., (2004) Menadžment ljudskih resursa – apologija humanog kapitala, Univerzitet u Novom Sadu, Tehnički fakultet "Mihajlo Pupin", Zrenjanin.

Sajfert Z., Đorđević D., and Bešć C. (2006) Leksikon menadžmenta, Univerzitet u Novom Sadu, Tehnički fakultet "Mihajlo Pupin", Zrenjanin.

Sajfert, D. (2018) Etično ponašanje lidera u organizacijama kao faktor individualnih i organizacionih preformansi, doktorska disertacija, Univerzitet u Novom Sadu, Tehnički fakultet "Mihajlo Pupin", Zrenjanin.

Shareef, Tarik Atan (2018) The influence of ethical leadership on acadenic employees' organizational citezenship behavior and turnover intention: Mediating role of intinsic motivation, Management Decision, 57(3) 583-605.

Thomas Terry, Schermerhorn R. John and Dienhart W. John (2004) Strategic leadership of ethical behavior in business. The Academy of Management Executive 18(2), 56-66.

Treviño, L. K., Brown, M., & Hartman, L. P. (2003). A Qualitative Investigation of Perceived Executive Ethical Leadership: Perceptions from Inside and Outside the Executive Suite. *Human Relations*, 56, 5−37.

Walumbwa, Mayer, Wang, Workman, and Christensen (2011) Linking ethical leadership to employee performance: The roles of leader–member exchange, self-efficacy, and organizational identification. Organizational Behavior and Human Decision Processes 115(2), 204-213.

Walumbwa, Morrison, and Christensen (2012) Ethical leadership and group in-role performance: The mediating roles of group conscientiousness and group voice. The Leadership Quarterly 23(5), 953-964.

Wang, Y. D. and Yang, C. (2016) How appealing are monetary rewards in the workplace? A study of ethical leadership, love of money, happiness, and turnover intention. Social Indicators Research 129(3), 1277-1290.

with leader's social responsibility, top management team effectiveness and subordinates' optimism: A multi-method study. The Leadership Quarterly 19(3), 297-311, 2008,

Wayne, S.J. and Green, S.A. (1993) The effects of leader-member exchange on employee citizenship and impression management behavior. Human Relations 46(12), 1431-1440.

NEW KNOWLEDGE AND SKILLS FOR THE DIGITAL AGE

Marijana Vidas-Bubanja
Belgrade Business and Arts Academy of Applied Studies, Belgrade, Republic of Serbia
Srđan Bogetić
Belgrade Business and Arts Academy of Applied Studies, Belgrade, Republic of Serbia
E-mail: sbogetic@yahoo.com
Cariša Bešić
University of Kragujevac, Faculty of technical science, Čačak, Republic of Serbia
Zoran Kalinić
Independent University Banja Luka, Banja Luka, Bosna i Hercegovina
Iva Bubanja
Belgrade Business and Arts Academy of Applied Studies, Belgrade, Republic of Serbia

ABSTRACT

Modern business is facing major challenges brought about by technological changes, necessitating it for companies to properly get their human resources ready for the new digital age. In this paper, the authors analyze the relationship between the digital economy and the changes in the labour market field that have occurred as a result of the intensive implementation of digital technology in business operations. Creativity, innovation, flexibility and adequate human resource management are the most important determinants in the new business philosophy. The key factor that decides the new model of organizational management in the global economy is knowledge, as is the speed of acceptance of business changes. In addition, new business skills are gaining in importance. The authors in this paper provide an attitude analysis expressed by domestic owners/executives/ managers on the needs for the acquisition of new knowledge and skills and open questions related to employee reskilling.

Key words: Knowledge, Skills, Digital technologies, Competitiveness, Human resources.

INTRODUCTION

The business environment is constantly changing under the influence of intensive technological development, changes in competitive relations in the late 1990s and the effects of the 2008 global economic crisis. The world is reaching a new level of economic globalization where national economies have become closely connected, which is characterised by necessary monitoring and responses to the challenges and dynamics of the new business environment. At the micro-level of personal activities, business organizations need to create new models of behaviour in relation to the observed and expected changes, all in order to maintain competitiveness in the long run and ensure constant growth dynamics (Đorđević et al., 2016, p. 120).

The profound effects of technological advances on the world economy, along with globalization and demographic changes, have led to a burning social problem: how to empower people with the skills necessary for their participation in the economy – both now and in the future. The new digital business environment has accentuated the need to reconfigure and improve the supply of knowledge and skills in the labour market so that workers at the global level can meet the needs of modern companies' new models of work and business operations. This asks for new kinds of support governments and companies should provide to the educational system as well as the redefining of approches to work, curriculum and mode of operation of educational institutions themselves (WEF, PWC, 2021, p. 4).

In addition, the COVID-19 pandemic has further brought to light the inadequate attitude of companies towards the growing mismatch between people's current skills and those needed for jobs in the context of

the sophisticated technologies of the Fourth Industrial Revolution. Millions of workers have lost their jobs due to unstable market conditions, the effects of COVID-19 or because they worked in industries that are being replaced by new sectors. Thus, the critical need for reskilling and upskilling the workforce is emphasized even further. Negative effects are equally present: 1) at the workers' personal level, which leads to growing social instability, 2) at the company level where companies do not secure adequate labour for their business processes and therefore record a decline in revenue, 3) at the state level with falling tax revenues and rising social welfare payments.

DIGITAL ECONOMY AND THE CHANGED LABOUR MARKET

Digital economy is usually defined as a new form of economy that uses digital technologies in its operations and for most countries today it is one of the most attractive growth opportunities. These growth opportunities are primarily related to the potential of this economy to create new chances for investment and innovation leading to expanding business opportunities, creating improved business processes and models and thus creating new jobs. Depending on the scope of the digital economy definition, estimates suggest that it currently accounts for between 4.5% and 15.5% of the global GDP. Forecasts further confirm such upward dynamics with predictions that by 2022 over 60% of the global GDP will be digitized and that 70% of new values created in the economy in the next decade will be based on digitally-enabled platforms (UNCTAD, 2019).

Open platforms and increasingly advanced digital technologies are at the heart of the modern digital economy. Therefore, a developed infrastructure is a prerequisite for modern digital age companies to be able to build value-added services and processes. As a new infrastructure that connects the supply and demand of individuals in real time and on a wide scale, digital platforms are revolutionizing the way business is done and the way both micro-enterprises and industries as a whole operate. Economic theorists also point out that a platform infrastructure characterized by the integration and alignment of multiple technologies (cloud, automation, analytics, artificial intelligence, mobile communications, the Internet of Things) creates a new "as a service economy" - an economy as a service, where system service becomes dynamic, on-demand, targeted (personalized) to each consumer individually (Turban et al., 2018).

In addition to technology and capital, knowledge is the third pillar of the digital economy. Knowledge encompasses the necessary infrastructure that enables digital transformation through the discovery, understanding and learning of new technologies. When commenting on knowledge as a factor in creating competitiveness for the new digital age, the ***IMD World Competitiveness Center divides it into three sub-factors***. The TALENT sub-factor includes the educated workforce and the skills available in a given economy to carry out the digitization process. Talent availability is based on EDUCATION AND TRAINING which is another sub-factor. The third sub-factor, SCIENTIFIC CONCENTRATION, indicates the importance of investing in research and development and knowledge production which is necessary in the new digital economy (IMD World Competitiveness Center, 2017).

The importance of knowledge and skills, particularly the mobility of skills, may be seen in the coinage of the new term Skill economy, which emphasizes the importance of flexibility and knowledge transfer for the future economy where jobs will be created or eliminated with each new technological wave. For example, research conducted in Canada, a country with 18.5 million jobs, indicates that half of these jobs will be threatened by the emergence of new technologies, but that at the same time digital technologies will create or open about 2.5 million new jobs (McKay, 2019). Furthermore, it is important to emphasize that the functioning of the digital economy is determined not only by the knowledge of workers who appear on the labour market, but also by the knowledge of various social categories participating in the digital economy, not as value creators, but as mentors, advisors or simply users. The capital of the new age will be based on deep specialization in several important areas, as well as on the acquisition of various knowledge and possibilities. An individual must be prepared for various challenges both as a member of a team, but also as a project or solution leader based on the authority earned by possessing deep, specialized knowledge (Vidas-Bubanja, 2019).

Technological innovations significantly profile the workings of the labour market, where there is a shift in demand from routine and lower-skilled workers to a workforce with higher education and digital skills that can respond to the challenges of new jobs. The growth in demand for skilled workers directly affects the growth of wages for workers with adequate skills and the decline in wages or job losses for lower-skilled workers. Another

consequence of this shift in demand in the labour market is related to the fact that the lack of educated workers in a large number of companies hinders the faster implementation of digital innovations and contributes to slower growth of their productivity. As the differences in productivity and profitability between firms grow, so does the pay gap between their workers. Industries that are experiencing greater market concentration and expansion, and that earn higher economic rents, can offer their workers higher wages (Stansbury & Summers, 2018). Big and powerful giants thus offer high wages and get the highest quality workforce. Thus, in addition to the monopoly power in product markets that increases their margins and allows rent growth, these powerful companies now also have monopoly power to dictate wages in the labour market. As the employers‘ market power strenghtens, the workers‘ negotiating power weakens, with the decline of trade union association and the erosion of the law on the minimum wage (Azar et al., 2017). All these factors increase social inequalities and open space for social unrest.

As part of the growing preoccupation with the lack of workers with the skills and knowledge required by the new digital economy on a global level, the fact that 65% of children attending school today will have a job in the future that does not yet exist is often cited. At a time when most organizations are undergoing digital transformation, the digital skills gap is hampering progress in 54% of companies and costing the global economy billions of dollars (Burger, 2019).

One of the major challenges that globalization is confronting today's workers with is related not only to the level of knowledge and skills an individual needs in order to be perceived as an recruit in a modern, open labour market, but also to the growing competition between workers globally. This is due to the fact that digital technologies are opening up and changing opportunities in such a way that production and skilled workers can now be located anywhere in the world and work for a company from another country remotely. The difference between them is again the level of knowledge they have, but also the flexibility of an individual to survive in such a labour market and offer his or her multiple abilities (Vidas-Bubanja & Bubanja, 2019). In addition to the direct competition from a provider of labour services located thousands of kilometres away, the modern worker increasingly has machines for competitors. The question arises as to the further advances in the human-machine relationship, or the robot-machine that is profiled through the concept of Industry 5.0 which asks for openness and willingness to accept the changing role of the production worker and his direct cooperation with the robot as a partner. Collaboration between robots and humans will enable joint work in production in many places where this used to be risky or questionable for various reasons. This new type of robot that can work directly with humans is called a collaborative robot or COBOT. Cobot and man can produce a better result together more precisely and faster than they could by working alone. Furthermore, the predictions are that the coefficient of artificial intelligence and robots could grow at an annual rate of 1-1.5 IQ points, which means that in ten years‘ time robotic intelligence will be higher than the intelligence of 90% of the human population (Nikolic, 2018).

TRAINING WORKERS FOR THE DIGITAL AGE

On the supply side of the labour market, we encounter an education system that reacts slowly to dynamic technological changes and the demand for new skills and knowledge. As a result, there is a mismatch between the skills available and skills required that are offered in the labour market. The system capacity for continuing education has been far exceeded by the growing need for worker in-service training and reskilling, and access to reskilling is usually more complex for lower-skilled workers.

In this way, on the one hand, educational institutions are faced with the urgent need to change and improve their educational content to better meet the requirements of the modern digital age and business, while, on the other hand, they are brought into a position where they have to change their own way of working and functioning by digitizing their offer. The outbreak of the COVID-19 pandemic has especially encouraged and accelerated the process of digital transformation of educational systems, because the need for creating high-quality digital educational content, distance learning, ICT education and training of teachers for the application of new digital tools have been clearly recognized, and above all the importance of a good infrastructure which would support the functioning of such transformed educational systems.

The fact that the educational systems in different countries are not equally prepared for such a digital transformation has also been shown by research analysis conducted in the first half of 2020, as they indicate divergent coverage in the delivery of digital educational content in educational institutions of different countries.

Distance learning in high-income countries encompasses about 80-85 per cent of students, dropping to less than 50 per cent in low-income countries (UNESCO-UNICEF-World Bank joint survey, 2020). This situation can be largely attributed to the existing global digital divide, with vulnerable students in regions with limited access to basic home services and a lack of technological infrastructure, but also where there are low levels of digital literacy and training present among students, parents and teachers.

A particularly sensitive issue in the transformation of educational systems in the context of unstable economic trends and the pandemic is the question of financing. In an environment where public funding is increasingly focused on health and social care, or encouraging business activity, long-term public spending on education is facing declining and limited funding. On the other hand, private financing will also become scarce as the economy weakens and unemployment rises.

The complexity of the digital transformation process of the educational system is a serious task which must involve all actors in the educational process, from schools and universities in the private and public sector, to states and its institutions. This changed context in terms of the required knowledge and skills and the slow reaction of the educational system highlights the important role companies must assume in employee reskilling and upskilling. According to the McKinsey Global Institute, companies faced two employee education challenges in the post-COVID-19 period. Namely, two changes that companies must adapt to have emerged. The first is related to the fact that companies must take on a more prominent role in the field of reskilling and employee training. The experience of successful companies has shown that this ensures greater mobility and adaptability of employees to new market demands related to the increasing application of digital technologies in business. Another change that some companies (Google, Hilton Hotels, Ernst & Young and IBM) have already addressed, is related to the need to prioritize skills over academic education when selecting new staff.

In this way, companies secure themselves with better flexibility and mobility of employees in the business processes. The prerequisite for such an employment approach is for a company to have a model of efficient identification and assessment of applicants' skills (Đorđević et al., 2021, p. 59).

In creating workforce training strategies, companies are guided by the core skills needed in the context of the globalization of production and trade, which include: collaboration and teamwork; planning and organizing; numeracy and literacy; basic digital skills; adaptability; self-management; learning to learn; negotiation; conflict resolution; persuasiveness; customer service; strategic, creative, innovative and critical thinking; communication; problem-solving; and decision-making (ILO, 2021, p. 11). Corporate culture is now based on continuous training and development of the workforce in the workplace and LLL (lifelong learning), because there will be a shift in the new workers' knowledge toward design thinking and working instead of only "production" thinking. The key orientation of employee training, in addition to new digital knowledge, therefore includes the competency to collaborate and cross-cultural knowledge. The technical competency of workers will be rather interdisciplinary than narrowly specialized (Ronald Berger Think Act, 2014).

EMPLOYEE TRAINING AND ADULT EDUCATION IN THE REPUBLIC OF SERBIA

According to the World Economic Forum report for 2019, which encompassed 141 countries across the world, the Republic of Serbia ranked 72nd on the world scale in terms of competitiveness, while in 2018 it ranked 65th in the world. This report covered the biggest problems of the domestic economy, of which the intensity of employee training is one of the most significant. Namely, the report presents indicators on the position of the Republic of Serbia according to the intensity of employee training, which shows insufficient activity of domestic companies measured by this parameter (104th place). The long-term business practice of domestic companies in this area is to invest in employee training, which is mostly attended by middle and lower-level managers. Executive management usually does not have a developed awareness of the importance of improving knowledge and skills and avoids any kind of engagement in this area.

Unfortunately, data related to adult education in Serbia are not up to date. The latest data that could provide an overview of this area is the Adult Education Survey (AES) conducted periodically in 2011 and 2016. Surveys have shown (Official Gazette, 2021) that the participation rate of adults in some form of

formal/non-formal education or training in Serbia was 19.8%, which is slightly higher than in 2011 (16.5%) but still significantly below the average of European Union member states (45.1%). Women were more represented (21.4%) than men (18%) in some form of education and training in the 12 months preceding the survey. The participation rate was highest among the population aged 25–34 (29.2%).

Based on the Adult Education Survey, we can analyze the structure of the research sample in the areas of lifelong learning and various forms of non-formal education. Women from 25 to 34 years of age, who are university graduates, employed and living in city areas represent the dominant group in the field of lifelong learning. In addition, employed persons (32.5%) represent the group that most often engages in training. Highly-educated respondents represent the group which has the most attendants in workshops, courses or private lessons. Research has shown that non-formal education is mostly linked to the activities of the company in which the respondent works, while the reason for attending this type of education is related to retaining an existing job, promotion or getting a new job. What presents a problem in adult education may be shown by two indicators: almost 80% of respondents did not participate in any form of formal or non-formal education; out of the total number of respondents, 47% were not able to get involved in any form of education due to the following reasons: lack of financial resources, inadequate training offer, inability to adjust training dates with working hours and family reasons. The Adult Education Survey has shown that informal learning as a model of education is extremely common among respondents. Most users of this type of education take advantage of the following sources of educational content: computer (65.8%); help from family members, friends or colleagues (63.6%); television/radio, video about 60%; printed materials (57.5%).

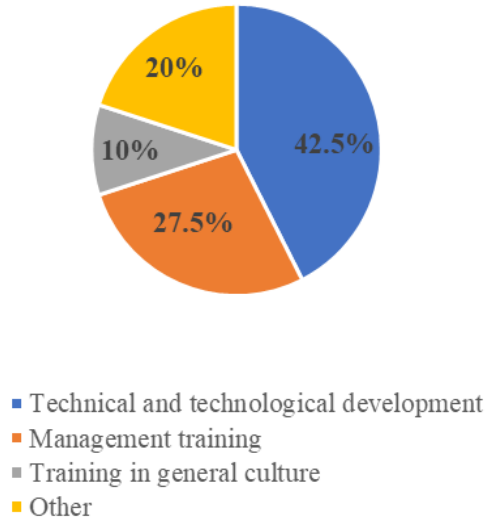
When it comes to trends in adult education, it is worth pointing out education in the field of information and communication technology (ICT), which is one of the three priority areas of the Europe 2020 strategy, in the section entitled "Smart Growth". According to the data obtained from the 2011 census, in the Republic of Serbia, in terms of computer literacy, out of 6,161,584 citizens over the age of 15, 34.21% are computer literate, there is 14.78% of those who are partially computer literate, and 51.01% is computer illiterate. Recognizing the importance of digital literacy as necessary for full participation in the 21st-century society, and following European educational trends, where digital literacy is identified as one of the eight key competencies, the Ministry of Education, Science and Technological Development has, within Functional Adult Primary Education, introduced a special subject called Digital Literacy, which is studied starting with the first cycle and has been implemented in 64 schools in Serbia (Official Gazette, 2021).

Non-formal adult education training programs for the acquisition of professional competencies are created based on the following data: analysis of the labour market in the Republic of Serbia, employers' planned needs as well as the priorities defined by the national strategy. All accredited training programs planned in the field of non-formal education are implemented by institutions working in this field. Participants receive a certificate as proof of acquired professional competencies. A prerequisite for the realization of the process of adult education is the creation of an environment in which the application of new knowledge and skills in business is a comparative advantage over the competition. Also, there is a need for higher education to follow the trends in the labour market and to harmonize its study programmes with new business trends characterized by an intensive application of digital technologies, but also areas related to sustainable development. It is imperative that companies, as well as current and future employees, be ready for the challenges that await them in the digital age.

ANALYSIS ON COMPANIES' ATTITUDES ON THE NEED TO APPLY EMPLOYEE NEW SKILLS AND KNOWLEDGE IN THE REPUBLIC OF SERBIA

The research related to "Analysis of companies' attitudes on the need to apply employee new skills and knowledge" was conducted in the period February-April 2022 on the territory of the Republic of Serbia, on a sample of 50 companies, 94% of which are privately owned. According to the majority of respondents (52%), in the last five years, companies have not changed the structure of required skills and knowledge for employees in their human resources policy. The results of the research showed that teamwork (72%) and kindness, approachability and good rapport in a community (62%), are the most common skills required of

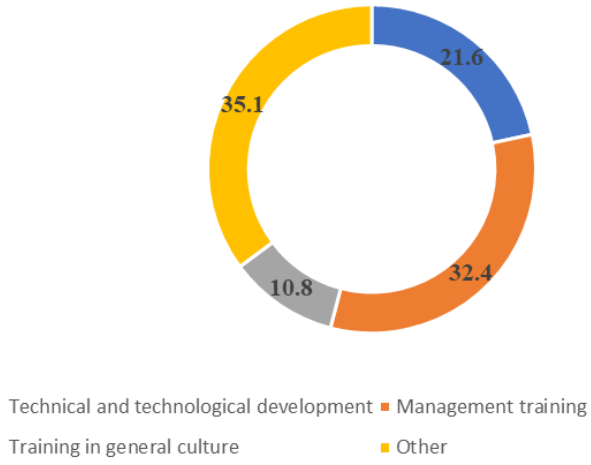
candidates in the employment process. The data indicate that in these companies there is a developed awareness of the importance of teamwork as a model of organization that until recently has not been effectively applied in domestic companies. Following modern business trends, the surveyed companies are ready to cooperate with the community and contribute to the protection of the environment and people as a whole, which shows a growing level of socially responsible business practices of domestic companies.



Of the total number of surveyed companies, 78% fully agree with the view that companies that encourage innovation of knowledge and skills of employees improve competitiveness and productivity. This is in line with the data obtained that 74% of surveyed organizations provide employee professional development, mostly in the fields of technical and technological training (application of digital technologies - 42.5%) and management training (teamwork, problem-solving, business decision-making, critical thinking, interpersonal communication - 27.5%) (Graph 1).

Graph 1: Areas of employees' professional development in business organizations

The research has also shown that when recruiting employees, companies pay most attention to practical experience (48%) and recommendations of colleagues and associates (24%). Acquired education, as a criterion for recruitment, is represented by 14%, while proof of continuous training as a criterion is considered by only 8% of surveyed companies. Unlike international corporations, which put continuous development of knowledge and skills at the forefront of employment criteria, employee professional experience is still a priority for domestic companies. This is one of the reasons why domestic companies have low competitiveness compared to international companies, which is especially evident in situations when there are changes in the market and when they have to adapt to the new situation.Furthermore, the owners/directors/executives/managers of the surveyed companies (62% of them) expressed the opinion that they attended trainings in the past year, mostly in the field of management (teamwork, problem-solving, business decision-making, critical thinking, creativity, interpersonal communication) (32.4%) and applications of digital technologies (21.6%) (Graph 2).



Graph 2: Areas showing last year's respondents' training in %

The research respondents gave their opinion on the question of reskilling as a model of adjusting employees to new skills and knowledge. The majority of respondents, 85.7%, agree with the view that employee reskilling programmes enable faster and more efficient adaptation to new business conditions. However, only 18% of respondents said they needed reskilling. In the domestic labour market, reskilling is related to the model of training for persons who are unemployed or who during the privatization process must be trained for other jobs that there is a need for.Unfortunately, companies themselves still do not show adequate acceptance of reskilling as a model of employee training that helps them train existing employees for another job and thus achieve better turnover of business processes in the organization.

CONCLUSION

The modern business environment has changed under the dominant influence of increasingly advanced and sophisticated digital technologies (quantum computing, cloud, big data...) New development concepts such as Industry 4.0 and Society 5.0 will profile the global digital economy in a new and different way, redefining the ways of industrial production in the world. Few experts would dispute the fact that there will be winners and losers in the development and implementation of these development concepts, and that the whole world must face many risks of dynamic technological growth, such as the one indicated by a WEF survey stating that digitalization in the industries of modern countries after 2020 could abolish five million jobs (Brkić, 2016). In this sense, the world is facing a great challenge - protecting businesses and jobs using the benefits of artificial intelligence and robotics wisely to alleviate economic stagnation and global imbalances and ensure continued dynamics of sustainable growth globally.

The digital age requires companies and employees to be able to apply a variety of knowledge and skills. Employees today need to be versed in diverse aspects, as this is the only way to respond to new market needs. However, the problem is the mismatch between the available and required skills offered in the labour market. Educational institutions have not adequately responded to dynamic technological changes and the need for new skills and knowledge. Also, the concept of continuing education has been exceeded by the growing need for training and reskilling of workers, and access to reskilling is usually more difficult for lower-skilled workers.

Adult education in Serbia is still not at the satisfactory level required by highly developed economies. Data from the Adult Education Survey show that the participation rate of adults in some form of formal or non-formal education or training is significantly below the average of EU member states. An additional problem in adult education lies in the fact that almost 80% of respondents did not participate in any form of education (formal or non-formal), and that of the total number of respondents, 47% were unable to engage in some form of education. The most common reasons for respondents not attending training are insufficient financial resources, inadequate training offers, inconsistency of training dates with working hours. In order to promote adult education, it is necessary to establish an effective system of incentives for companies and employees in the field of acquiring new knowledge, skills and reskilling. The following insitutions must have an active role in this area: the Serbian Chamber of Commerce, the Ministry of Education, Science and Technological Development, the Ministry of Economy; Universities, higher istitutions of professional education, but also non-governmental organizations dealing with adult education.

The research "Analysis of companies' attitudes on the need to apply employee new skills and knowledge" has shown that companies have a developed awareness of the needs for professional development of employees, but also the management itself. The research indicated that the surveyed organizations encourage employee professional development, mostly in the field of technical and technological training. Furthermore, in addition to the employees themselves, the company's management is focused on its own professional development in the field of management. However, when recruiting employees, companies pay the least attention to proof of continuous training. Priority is given to the employees' professional experience and recommendations from colleagues. The surveyed companies understand the importance of reskilling employees in order to adapt faster and more efficiently to new business conditions. However, in practice, domestic companies still do not sufficiently apply this model of employee training, which would allow workers to adapt to new digital business tools and enable companies the growing ability to faster adapt and respond to dynamic changes in the modern business environment.

REFERENCES

Azar, J., Marinescu, I. and Steinbaum, M., "Labor Market Concentration," *NBER Working Paper*, 24147, December 2017.

Brkić M., (2016) „Industry 4.0" ili reindustrijalizacija Evrope", preuzeto sa: http://www.novimagazin.rs/ekonomija/industry-40-ili-reindustrijalizacija-evrope

Burger, B., (2019). *Is digital intelligence the key to Globalization 4.0?*, January, https://www.weforum.org/agenda/2019/01/is-digital-intelligence-the-key-to-globalization-4-0/.

Đorđević D., Ćoćkalo D., Bešić C., Bogetić S., Bakator M., Uloga znanja u procesima unapređenja poslovanja u uslovima nove ekonomske stvarnosti, Zbornik radova *XVII Evropska nedelja kvaliteta – JUSK ENK 2021,* Jedinstveno udruženje Srbije za kvalitet – JUSK, 4-5 novembar, 2021., Beograd, str. 54-74

Đorđević D., Ćoćkalo D., Bogetić S. (2016)., *The analysis of marketing concept implementation in domestic enterprises,* Journal of Engineering Management and Competitiveness (JEMC), TF Mihajlo Pupin, Zrenjanin, Vol. 6, No.2., pp. 120-128

Evropska Komisija (2020), Komunikacija komisije europskom parlamentu, vijeću, europskom gospodarskom i socijalnom odboru i odboru regija, *Program vještina za Europu za održivu konkurentnost, socijalnu pravednost i otpornost*, Brisel

Global framework on core skills for life and work in the 21st century, (2021), ILO, Switzerland

IMD World Competitiveness Center (2017). *IMD World Digital Competitiveness Ranking 2017*, Swizerland, https://www.imd.org/wcc/world-competitiveness-center-rankings/world-digital-competitiveness-rankings-2017/.

McKay, D., (2019). *Humans wanted: why automation won't kill off your job*, January, https://www.weforum.org/agenda/2019/01/humans-wanted-why-automation-wont-kill-off-your-job/.

Nikolić, G., (2018). Moj prijatelj kobot, *Smart InfoTrend*, br. 208, str. 28-38.

Official Gazette RS, No. 20, 10.3.2021

Ronald Berger Think Act (2014) *Industry 4.0 The new industrial revolution*, How Europe will succeed, March.

Stansbury, A. and Summers, L., "Productivity and Pay: Is the Link Broken?" *Working Paper No*. 18-5, Peterson Institute for International Economics, 2018

Turban, E., Pollar, C., & Wood, G., (2018). Information Technology for Management: On Demand Strategies for Performance, Growth and Sustainability, John Wiley & Sons.

UNCTAD (2019). Digital Economy Report 2019, Value creation and capture: implications for developing countries, Geneva.

UNESCO-UNICEF-World Bank joint survey, May–June 2020. Out of 116 countries that responded, few reported monitoring the actual use of distance learning. Available at http://tcg.uis.unesco.org/survey-education-covid-school-closures

Vidas-Bubanja, M, Bubanja, I., (2019), „Globalizacija 4.0 - novi kvaliteti i novi izazovi", *The 16th International Convention on Quality - ICQ 2019, Proceedings*, UASQ, 4-6 th June 2019, Belgrade, Serbia, str. 66-72.

Vidas-Bubanja, M. (2019), Izazovi Srbije u uslovima globalizacije 4.0, poglavlje u moniografiji *Svet i Srbija ekonomska i društvena gibanja*, Centar za izdavačku delatnost Ekonomski fakultet Beograd, Beograd, str. 125-159.

World Economic Forum, *Upskilling for Shared Prosperity,* (2021)

BOOKING AS A DIGITAL MARKETING CHANNEL IN TOURISM

Bruno Završnik
University of Maribor, Faculty of Economics and Business, Slovenia
E-mail: bruno.zavrsnik@um.si

ABSTRACT

Digital marketing channels have a key role to play in companies today in effectively and consistently reaching target groups. Compared to traditional marketing channels, digital marketing channels are also cost-effective and measurable. Today, most companies use the Internet to buy and sell goods and services. Our research was focus on the online sales of services, in particular online booking of services and the Booking.com platform. We also wanted to check out the acceptance and satisfaction with the use of digital marketing channels for services such as the Booking platform. The aim of the survey was to find out how many respondents have already used the Booking platform, how satisfied they are with its use, and what kind of service they have booked. Research has shown that most people travel with Booking in the age group of 18 to 30 years.

Key words: Marketing channel, Digital marketing, Booking platform.

INTRODUCTION

In the rapidly changing environment of the modern world, it is important that companies connect with technology. By this we mean not only the digitization of products but also the digitization of services. Due to new trends and newer technologies, the need for digitalization is increasing, and customers can be in constant contact with information and services with the help of the Internet. It is for this purpose that a good knowledge of the marketing channel is crucial for the success of the company.

There is no doubt that Digital Marketing is used by so many businesses of different industries and has proven its worth in delivering many more leads to them. And of course, more leads mean more business, and more business means more profit. The travel industry is no different and has adapted well to the realm of the digital world to increase their brands' awareness and be able to reach more possible customers as much as they could.

It is time for going beyond tourist experience by offering the necessary transformations, better understanding a digital marketplace more centered on a complex consumer journey, monitoring travel and digital trends and ensuring an adequate experience across all channels and interactions. Travel organizations need to have an adequate infrastructure and to offer this engagement experience in the traveler’s language and on the device of their choosing, reaching travelers through digital marketing channels and viewing marketing ROI in terms of lifetime value of the customer. Ratiu & Purcarea 2015)

Online media and digital marketing are developing with fast pace and replacing other communication channels, becoming one of the main tools for targeting customers. Nowadays, digital media plays a significant role in various aspects of tourism. Many hospitality firms have introduced online communities as new marketing channels in their business. further development of the Hoteliers industry in this region.

Digital platforms help in getting maximum leads which helps in expanding the business and so as the profit. With the help of digital marketing various travel deals and offers reaches the potential travelers than traditional marketing. Social media has a strong impact on digital marketing. It helps in

developing brand awareness. The young travelers now do not rely on the travel agent. They use digital platforms to decide the destination and plan their journey. Travelers are using all the digital media which is boosting the tourism industries. Digital marketing has made it easy for tourists to plan their complete journey, starting from selecting the destination to booking the tickets and hotel. It is helping not only the customers but also the tourism businesses to build their strong networks and customers. Digitization has brought great opportunities for tourism industries to implement variety of digital marketing strategies, which will help them in creating awareness about the company and their services. Large number of audiences can be reached using digital marketing. Exclusive offers can be provided which will inspire travelers. Customers in any part of world can be connected by the means of digitization. Customer's needs and requirements can be understood even before they enquire about services. "The best places to travel" is the most common and most searched line on search engines by travelers does not matter if the person is a traveler or seasoned traveler. This is the reason it is very important for the personnel in tourism industries to invest in search engine optimization. That helps in increasing number of visitors who visit your pages and get to know your exclusive offers. Encouraging the travelers to buy your product is not the only goal of digital marketing. (Avhad & Anute 2021).

Many tourism companies are getting online to promote and present their services online in order to stimulate communication with clients, to sell more, and to reduce cost associated with interaction with customers. The whole tourism sector is changing with the growth of information communication technology and these changes has affected the methods through which tourism products and services are communicated and delivered to customers around the world.

ONLINE BOOKING SYSTEM

Prior to the development of the Internet in the tourism sector, travel agencies and tour operators were the only choice for hoteliers. Consequently, it was thought that the development of Information and Communication Technologies (ICTs) would offer an ideal opportunity for disintermediation in tourism. Digital evolution in the tourism industry has meant a change in the position of power of the people involved. This process has led to changes in the contribution of the members of distribution channels to the final tourism product, as they have been affected to a different extent. An improved position of power entails an increase in responsibility in the value chain.

The above is evidence of how necessary it is for researchers to focus on tourism distribution channels, particularly to achieve a more effective management which would contribute to a better multi-channel marketing mix. This would fulfil the business objectives in the era of the new digital evolution. Specifically, research must focus not only on relations between suppliers and distributors in the tourism industry but go further and seek elements which configure these relations. The latter are obviously influenced by internal management expertise in the making of decisions on marketing strategies. (Kontis & Skoultsos, 2022)

The world-leading OTA (Online Travel Agency), Booking.com, is the perfect brand example whose marketing activities are clear and well-executed. Beyond high numbers that speak for themselves, Booking.com has another peerless advantage: the combination between a strong brand positioning and a savvy social media strategy which translates into a front-of-mind brand for consumers who are looking for travel services.

Marketed as not just a platform for booking accommodation, but a technology that makes travel easier, Booking.com has been growing impressively and is one of the most recognizable travel brands worldwide. (Stanciu, 2021)

Booking.com owns the website "www.booking.com" and the application (together they form the "Platform"). Booking.com provides an online booking service through the Platform, through which - among others - accommodation providers such as hoteliers and other providers (the "Provider") can offer their products and booking services, and users of the Platform use this to make reservations.

Booking.com B.V. does not buy or (re-) sell products and services available for reservations. (Booking, 2021)

All information about providers published on the platform is based on information provided by providers who update prices, availability, and options at their own discretion via the extranet website that they can access. Booking.com is working to update the platform in real time.

Booking.com strives to display search results that are relevant to each specific guest by providing a personalized default ranking of providers on our Platform. Guests can scroll through the default ranking, apply filters, and sort by alternate ranking order, influencing the presentation of search results to receive ranking rankings based on other criteria. Booking.com uses several algorithms to generate default ranking results, and this process is constantly evolving (Booking, 2020)

EMPIRICAL FINDINGS

The survey was published online using the 1ka program. We shared the link to the survey via e-mail and distributed it to various groups on Facebook. The total number of respondents for carrying out a market survey was 115 of this, 67 were women and 47 were men.

When asked about the use of the Booking online system, more than half of the respondents answered that they had already used the Booking system, which represents 73%. 27% of respondents do not use this system yet, so they did not answer the following questions. Picture 1 shows that among the 83 respondents who have already used Booking, are 32 men and 51 are women, of those who do not use the booking system, there are 15 men and 16 women.

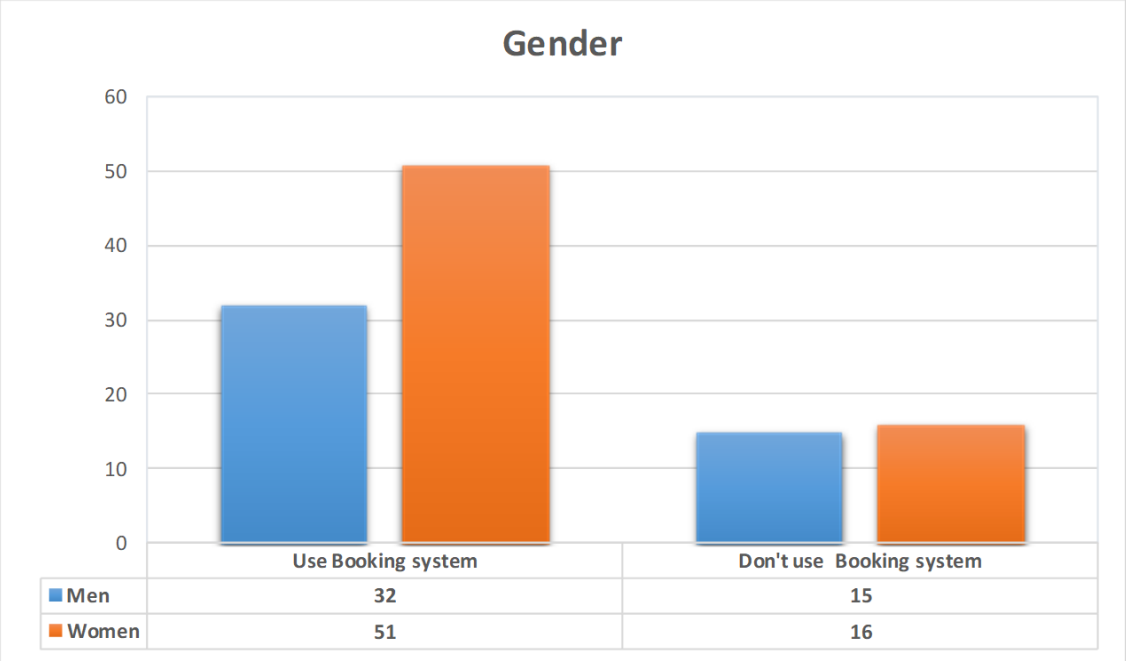


Figure 1: Using the online Booking system

The Table 1 shows age structure of online Booking users. Most of them were in the age group of 18 to 30 years, (51%). This is followed by the age group between 31 and 40, which is (22%). Only one was in the age group of 61 years and more.

Table 1: Age of the respondents

Age (Years)	Frequency	Percent
To 18	0	0%
18 - 30	42	50%
31 - 40	18	22%
41 - 50	9	11%
51- 60	13	16%
61 and more	1	1%
Total	83	100%

Those respondents who answered that they had already used the Booking online system then answered the following question. We were interested in where or who introduced them Booking online system (Figure 2).

Most of them answered that they were introduced by friends, then family, coworkers, and partner. As another options, they mentioned that they got to know themselves online and the employees of the travel agency.

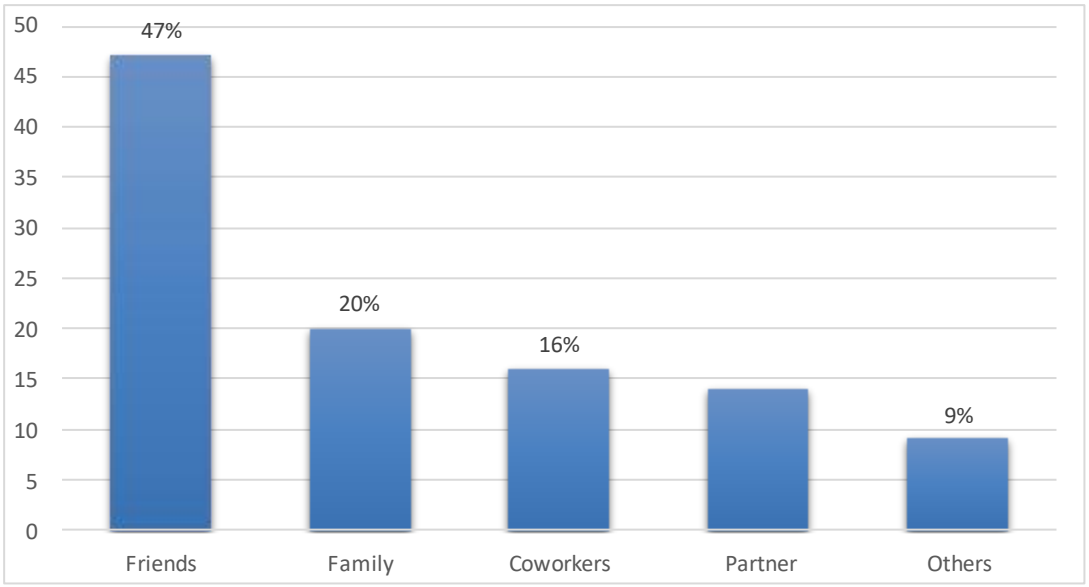


Figure 2: Introduction to the online Booking system

With the next question, we wanted to find out what type of accommodation the respondents choose using the online Booking system. Most of them chose the apartment, which represents 50%. In second place as the type of accommodation they choose hotel with 46%. Then follows holiday house, a cottage, and a resort. Several answers were possible (Figure 3).

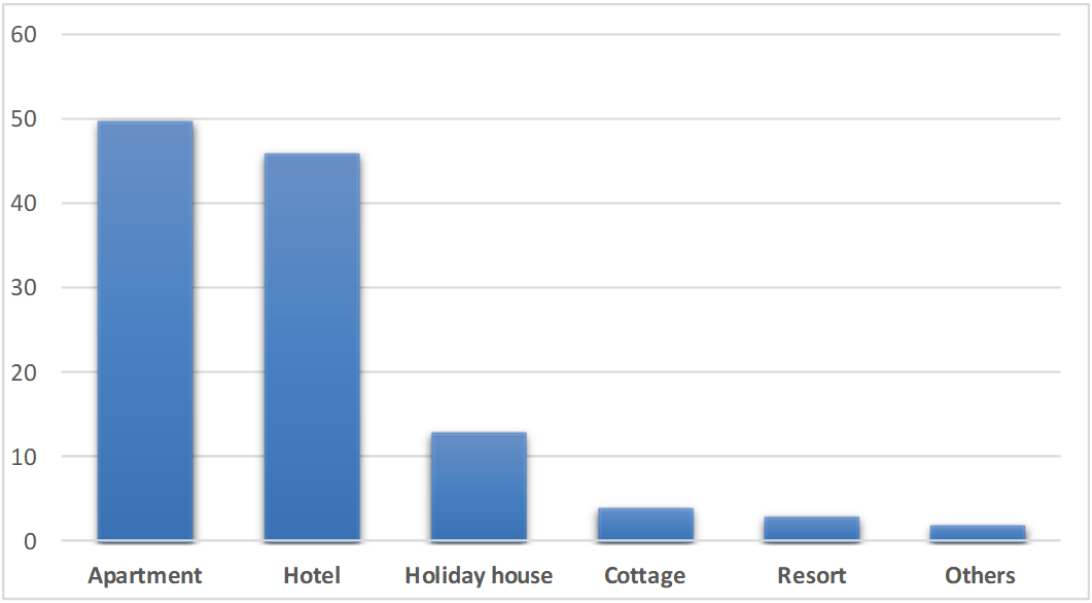


Figure 3: Type of accommodation

Table 2: Statement regarding satisfaction with the online booking system

Statement	Satisfaction with the online booking system				
	Very satisfied	Satisfied	Undecided	Dissatisfied	Very dissatisfied
Realization of wishes (requirements) on the trip	34	55	11	0	0
Website transparency	42	52	6	0	0
Availability of information	40	52	8	0	0
Understandable information	31	63	6	0	0
Quality of service provided	48	47	5	0	0
Clarity of the offer on the website	33	57	10	0	0

With the next question, we wanted from the respondents to agree or. disagree with different statement Table 2).
34% of respondents were very satisfied with the first statement, 55% were satisfied and 11% were undecided. From this we can conclude that most respondents are satisfied with the online booking regarding on the requirements they have on the trip.

To the second statement, 42% respondents said they were very satisfied with the statement, 52% were satisfied and 6% were undecided. We see that the respondents also agree with the second statement and are satisfied with the transparency of the website.
40% respondents are very satisfied with the following statement, 52% are satisfied and 8% are undecided. In short, we can see that respondents are satisfied with the availability of information. In the fourth statement, the results showed that 31% respondents are very satisfied, 63% are satisfied and 6% are undecided about the understandable of the information.

The next statement is about quality of service provided. The results showed that 48%respondents are very satisfied, 47% are satisfied and 5% are undecided. From this we conclude that the respondents are very satisfied or satisfied with the quality of service provided.

The last statement was about the clarity of the offer on the website. 33% respondents are very satisfied, 58% are satisfied and 10% are undecided.

CONCLUSION

Obviously, with the entrance of new powerful intermediaries a 're-intermediation' takes place following technological changes and new characteristics of business environment. This 're-intermediation' means that powerful new intermediaries enter the industry and that disintermediated ones may also re-enter. A variety of tools are available to consumers through the Internet and mobile technology allowing them to search for and purchase services directly from the suppliers. As a result, e-intermediaries in tourism distribution channels are in the powerful position of exploiting this situation, thus harming that of the suppliers. So, the power is now in the hands of the intermediaries who use new technology rather than in the hands of the suppliers. (Nilead 2018).

Today's travelers are using all types of devices and online channels to fulfill their travel planning needs. Therefore, hoteliers need to build and execute a comprehensive online marketing strategy to cover the most ground and always be where their customers are looking. By leveraging a wide variety of online marketing initiatives and unique channels, hotel marketers can increase online visibility and ultimately, the number of online hotel bookings. (Beach 2019).

The research also provides some opportunities for further research. We could compare the use of the Booking platform with other digital online booking tools in the tourism industry. We could also take a closer look at the current situation at the time of the Covi-19 epidemic. Booking's response to reservations.

REFERENCES

Avhad, T.,& Anute N. (2021).Digital marketing strategies adopted by online tourism companies in india, *Vidyabharati International Interdisciplinary Research Journal 12(2).*

Beach, G. (2019). Top 9 digital marketing channels for hoteliers to boost online booking rates. https://www.productsup.com/blog/online-marketing-channels-hotel-bookings/,

Booking. (2020). *Booking.com.* https://www.booking.com/content/about.sl.html

Booking. (2021). *Booking*. com: https://www.booking.com/index.sl.html

Kontis, A.-P. and Skoultsos, S. (2022). Digital evolution in tourism marketing channels: Greek tourism industry and Online Travel Agencies. *European Journal of Tourism Research* 30, 3004.

Nilead, (2018). Digital Marketing in Travel and Tourism Industry https://nilead.com/article/digital-marketing-in-travel-and-tourism-industry.

Ratiu, M.P. & Purcarea, I.M. (2015). Reaching travelers through digital marketing channels, https://www.researchgate.net/publication/343161955_Reaching_travelers_through_digital_marketing_channels.

Stanciu, T. (2021). What is Booking.com's digital marketing strategy? https://www.socialinsider.io/blog/booking-social-media-strategy/#aboutBooking.

Session A: MANAGEMENT AND OPERATION MANAGEMENT

Papers (pp. 47-134):

CONSTRUCTION PROJECT COST MANAGEMENT USING BIM

Ali Reza Afshari
Department of Construction Management, Shirvan Branch, Islamic Azad University, Shirvan, Iran
E-mail: afshari@mshdiau.ac.ir
Ghazal Jamili Emami
Department of Construction Management, Mashhad Branch, Islamic Azad University, Mashhad, Iran

ABSTRACT

The control of cost in construction projects is one of the most important issues in construction since the emergence of the construction industry. A successful project should meet not only quality output standards, but also time and budget objectives. The management and control of cost in construction is fundamental in every project. An effective cost management and control technique for construction projects is important in managing risk of cost overrun in completion of projects. Construction projects are becoming more complex as they now involve many stakeholders from different disciplines. The emergence of Building Information Model (BIM), an alternative technology is believed to solve issues related to project cost control as it efficiently increases collaboration between stakeholders. The aim of this paper is to review and summarize the causes of cost overrun in construction industries, which are the main causes of disputes and abandonment of projects in the industry. It was found that cost overrun eats deep into the industry and leave the construction industry with a bad image for decades even with rapid advancement in technology. The review of the applications of BIM showed that most of the applications are geared towards minimizing construction cost spent on projects. This means that the use of BIM in the management of construction projects has great impact on project cost.

Key words: Construction management, Building Information Model (BIM), Project cost management, Construction Project management, Construction industry, Project management.

INTRODUCTION

Control of cost in a construction project is one of the most important issues in construction since the emergence of the industry (Minchin et al., 2013). In this light, a successful project should not only meet quality output standards, but also budget objectives. Cost performance is a fundamental criterion for the success of any project. However, delay of project completion is very common in the construction industry due to ineffective cost control (Forbes & Ahmed, 2010). The essence of cost control is to ensure that projects are finished on time, and this is attainable through constant measurement of progress, evaluation of plans and taking appropriate action on the project (Kerzner, 2013). Buttressing this also is the Project Management Body of Knowledge (PMBOK), which suggests that in order to achieve the baseline objectives of any project, there has to be effective monitoring of project cost control. Inherently, cost are two major concerns in managing construction projects (Rasdorf & Abudayyeh, 1991). However, construction projects are becoming more complex as they now involve many stakeholders from different disciplines. Most of the features of projects that give rise to cost overruns do vary alongside with the project type, location, size and scope. Most of the time, construction projects that are large in nature and scope are characterized by their complexity and capital demands (Torp et al., 2016). In addition, the construction industry has many branches, and as such, it encompasses a lot of information about any one construction project. This is information that is very important to a project, and can be the basic foundation for decision-making, procurement and collaboration. The success of a project requires cost management among other factors to be considered before the commencement of the project (Masrom et al., 2015). Cost management starts with quantification, which takes a lot of time and is tedious in nature. Traditionally, the process is manually completed most of the time with high likelihood of human error, which tends to be higher when preparing estimates for complex projects. The use of computer-related applications allows for the making of more reliable decisions (Martínez-Rojas et al., 2016). Globally, the construction industry is replete with

high-profile projects that are faced with significant cost overrun (Smith, 2014). Unfortunately, construction project cost overrun is the norm in the Malaysian construction industry, leading to additional project costs (Enshassi et al., 2009).

The Malaysian construction industry is regarded as an industry facing poor performance leading to failure in achieving effective and efficient cost management. The emergence of alternative techniques is believed to minimize the issues relating to project cost control. Furthermore, it is also believed that the emergence of the Building Information Model (BIM) can lead to greater efficiency by means of increased collaboration (Zhang & Gao, 2013). The National BIM Standard (NBIMS) Project Committee of the Building SMART alliance referred to BIM as A digital representation of physical and functional characteristics of a facility, as such, it serves as a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its life-cycle from inception onward. The BIM is a shared digital representation founded on open standards for interoperability. (Succar, 2009) This suggests the Building Information Model (BIM) as an alternative approach to construction design; it does not only make digital representation of designs easier; it also provides all the necessary information for any project before construction (Xiao & Noble, 2014). Thus, the information represented by BIM models is very useful and can be analyzed to optimize the design, planning and construction processes (Azhar, 2011). Moreover, according to Bryde et al. (2013), BIM is an appropriate tool for project managers and should be considered by project managers as a way to help manage construction projects. However, BIM as an alternative technology in Malaysia needs to be studied to provide proof that it can satisfy the industry's need in improving cost control. It is also important to further investigate how cost control can be improved upon using BIM technology.

CONSTRUCTION PROJECT COST MANAGEMENT

Project cost control is a vital ingredient for a successful project. Project cost control is the process of monitoring the status of the project by updating the project costs and managing changes to the cost baseline. This provides means for the recognition of variance from the plan so as to take corrective actions and reduce risk. This, therefore, means that corrective action needs to be taken by personnel who incur cost in all companies irrespective of their size. The process for project cost control involves three main parameters, which are input, tools and techniques and output. The process and its parameters for input are project management plan, project funding requirements, work performance data and organizational process assets. The tools and techniques comprise earned value management (EVM), forecasting, to-complete performance index (TCPI), performance reviews, project management software and reserve analysis, while the output process and its parameters include work performance information, cost forecast, change request, project management plan updates, project document updates and organizational process updates. However, even with the vast integrated knowledge areas in project management, cost overrun are the most common issues in construction projects. Thus, it is significant to note that the degree of success of a project is defined within the triangle of scope, time and cost. As such, it is important to look at the causes of these cost overrun in projects. In this regard, delay is generally acknowledged as the most common, costly, complex and risky problem encountered in construction projects. Previous research conducted has shown that project delays are common and costly, making it an important study to know the causes of these problems for effective project management.

In Jordan, Al-Momani (2000) examined 130 government projects and stated that changes that were initiated by the designers, weather, client requirement, late deliveries, site condition and economic conditions were the main causes of delay in construction projects. According to Frimpong et al. (2003), in Ghana, material procurement, escalation of material prices, poor contractor management, poor technical performance and difficulties arising from agencies' monthly payment are the major causes of cost overrun in the construction of groundwater projects. In Hong Kong, the major cause of cost overrun was identified to be the poor management of sites, unforeseen ground conditions, change orders and poor decision making (Chan & Kumaraswamy, 2002). Furthermore, according to Odeh and Battaineh (2002), from the viewpoint of contractors and consultants in the construction industry, owner interference, inadequate contractor experience, finance and payment, labour productivity, slow decision making, improper planning and subcontractors are the major causes of delay in construction projects. Hsieh et al. (2004) conducted a study on 90 metropolitan projects in Taiwan, and identified planning and design as the major cause of change orders in the projects leading to cost overrun, while Sambasivan et al. (2007) stated that predominantly, delays are caused as a result of changes in design, poor planning and labour productivity. Moreover, in a study conducted by Kaliba et al. (2009), other prime causes of

cost overrun are client organizations delaying in making payment, modification of contracts, economic hardship, procurement materials, design changes, staffing issues, lack or unavailability of working equipment, poor supervision, mistakes during construction, poor site coordination, specification changes and labour. Abd El-Razek et al. (2008) conducted a survey on the causes of cost overrun and found that financial problems experienced during construction by contractors, owners delaying payment to contractors, changes in design by clients or their agents during construction and the lack of use of professional construction and contractual management were the main causes of cost overrun. In addition, research by Le-Hoai et al. (2008) on the causes of delay in Vietnam compared with those of other countries showed that in Vietnam, lack of experience, loose deadlines, poor cost estimates, design inefficiencies, labour incompetence, government-related issues and financial problems were the main causes of delay, whereas in Thailand, the main causes of delay were poor design, resource and labour shortages, poor project planning, inefficient contractor management, financial difficulties and change orders (Toor & Ogunlana, 2008). Cost overrun do occur internally and are generated by the sponsors, design team, contractors and consultants. At the same time, they could be externally caused through late material supply, government policies or weather conditions (Ahmed et al., 2003).

Olawale and Sun (2010) reported change in design as the most significant cause of poor cost control from the practitioner's point of view. The five main causes of delay in construction projects according to Alinaitwe et al. (2013) comprise scope change, payment delays, high cost of capital, poor monitoring and control and political insecurity and instability. Inadequate experience by the contractor, poor project planning, site management and change orders were among the 15 main causes of delay in Turkey according to Gündüz et al. (2012). Samarghandi et al. (2016) conducted a study on the reasons for delay and cost overrun in construction projects in Iran and developed a statistical model that categorised delay factors into four main categories. The categories include owners' defect, contractors' defect, consultants' defect and government laws, regulations and other general defects. Delay factors such as shortage of materials, change orders, delay in payment of suppliers, poor management of site and late submission of drawings are the main causes of delay.

Alaghbari et al. (2007) conducted a study on the causes of delay and ranked them. The researcher found that financial problems and coordination problems were the two most important factors causing delay in construction projects in Malaysia. Similarly, Sambasivan and Soon (2007) conducted research using a questionnaire to describe the 10 main causes of delay in Malaysian construction projects and found that they included poor site management, late payment, labour supply, improper planning, lack of experience, problems with subcontractors and shortage of materials. Al-Tmeemy et al. (2012) listed several causes of delay in Malaysia that included labour productivity, slow decision making, inflation, material delivery and insufficient equipment. Shehu et al. (2014) also stated that contract delays were predominantly caused by the contractors, while the other factors were associated with finance. Ahmed et al. (2003) and Al-aghbari (2005) in their separate research classified the factors causing cost overrun in Malaysian construction projects into four categories, which are contractor's responsibility, consultant's responsibility, owner's responsibility and external factors.

From the review above, one can conclude that the cause of cost overrun has eaten deep into the industry and have given the construction industry a bad image for decades. Unfortunately, such causes keep recurring even with the advancement in technology and rigorous research done to solve or minimize their recurrence. It is believed that the application of BIM will solve these issues as it integrates all the major stakeholders from different disciplines in a project when making and taking decisions.

BUILDING INFORMATION MODEL (BIM)

The contractor's guide to Building Information Modelling (BIM) describes it as a process of developing and implementing computer-generated models to combine the design, planning, construction and operation of a facility. In this light, Masood et al. (2014) defined BIM as a 3D digital representation of a facility with essential components and characteristics made up of intelligent building components. It is a means and practice of virtual design construction throughout the facility life-cycle that serves as a platform for knowledge and data sharing for communication between stakeholders (Eadie et al., 2015). While Olatunji et al. (2010) defined it as a representation of the combination of fairly revolutionary ideals for design technology, it portrays the geometry, geographic information spatial relationships, quantities and characteristics of building elements, material inventories, cost estimates and schedule of performance. BIM is basically a 3D digital representation of a facility. The model can be used to express the entire facility life-cycle. The model is data rich because of the

quantity of material involved, its properties can be easily obtained and the scope of work required can easily be defined and isolated from the model (Smith & Edgar, 2008). Contract documents, drawings, procurement details, specifications and other construction documents can easily be interrelated using the model (Bazjanac, 2006; Khemlani, 2007). Thus, a series of techniques that enable the practice and processes of construction and virtual designs through the project's life-cycle is the main concept of BIM (Zhang, 2012).

A lot of tools have been developed as a result of the spread of the concept of BIM in achieving its perspectives. These tools are used to manage construction projects, most of which are designed for specific purposes to meet the need of users, while a few are designed for multiple functions and information collection. The type of tool to be used depends on the purpose, user and stage in which it will be used. BIM tools enable 3D modelling and the management of information. The use of these tools makes BIM a unified system that interacts with all its parts. The table below shows some known BIM tools, their manufacturers and their functions.

Applications of BIM in Project Management

The potential of the application of BIM in the management of construction projects is similar to the Project Management Body of Knowledge (PMBOK); hence, it is an important tool for effective and efficient project management as it integrates stakeholders (Rokooei, 2015). BIM as a promising technology facilitates project management and the possibility of integrating building models and products, giving it high potential for management of project life-cycles (Gourlis & Kovacic, 2016) as it can be used throughout a project's life-cycle. It helps in understanding the project needs by the owner. It is also used for analysis, design and development of the project by the design team. The contractor also makes use of it in managing the construction phase, as well as in decommissioning, maintenance and operation carried out by the facility manager (Grilo & Jardim-Goncalves, 2010).

BIM is regarded as a great visualization tool as it provides 3D virtual representation of the facility (Zhang, 2012). This is the reason why in recent times, researchers and practitioners in the industry have been using it as an alternative means of interdisciplinary information sharing; it enables users to have an idea of the functional and physical characteristics of the facility in 3D visualization. Walk-through, rendering and sequence of the model can be provided by the project manager during project bidding for ease of communication with interested contractors. An outlook of the project, when completed, is provided through visualization of the model using BIM techniques, which solve the issues of having to combine the different 2D views of the proposed project to create a 3D view (Mohandes et al., 2015). The virtual models enhance collaboration and communication as it can be shown to the owner and designers during meetings. The sequence of the construction work and planning can be based upon the utility of the model component. The virtual models, which are cost effective, allow the contractor and the design team to work on the constructability analysis of the building, thereby reducing risk and potential design errors and saving time (Azhar et al., 2008).

Value for money can be improved through the use of BIM, as was shown through research conducted by Li et al. (2014). The evidence provided to justify their finding was from the Shanghai Disaster Recovery Centre project, which showed a potential benefit of optimized construction activities through cost-orientated activities. Moreover, BIM reduces waste and also optimizes efficiency throughout the project life-cycle as it supports integrated project delivery through a collaborative process (Glick & Guggemos, 2009).

Lavy et al. (2014) conducted research using a case study of the Solibri Model Checker (SMC), and it was found out that maintainability of the facility could be checked during the design phase, which will reduce the cost of maintenance during a project's life-cycle. This is possible as the 3D model offers facility managers the opportunity to anticipate maintenance accessibility problems and ways to resolve them. Lu et al. (2014) conducted a study on the cost benefit of implementing BIM by comparing two projects i.e., one using BIM and the other, conventional methods. It was found that the implementation of BIM saved cost by about 7% per square meter for the project. At the construction stage, it decreased the cost per square meter of the gross floor area by 8.61% when compared to the conventional designed and built project. According to Lu et al. (2016), cash flow analysis can be automated and simplified through 3D modelling design by linking cost and schedule information; this saves more time and cost compared with using the traditional method, which is time consuming. On the contrary, Masood et al. (2014) stated that BIM has very low impact on cost reduction, time and human resource in Pakistan's construction industry. According to Underwood (2009), BIM presents a non-redundant model of the project's life-cycle information to streamline its processes, which solves the problem of

redundancy when using conventional methods. Improvement in quality of design, construction and minimizing rework during construction are the three most important merits of using BIM. This was the perception of AEC professionals in Pakistan's construction industry (Masood et al., 2014).

Applications of BIM in Construction Project Cost Management

The adoption and implementation of BIM are steadily increasing in the built environment (Salleh et al., 2014). Meanwhile, through the adoption and implementation of BIM in a building project, Wong et al. (2009) believed that project stakeholders could maximize benefits regarding time, cost, and quality. However, it is not easy to achieve a right balance between these three factors for the construction projects, since so many strategies and solutions are needed to accomplish it, and innovation can be one of the possible solutions to strike a balance between these three factors. Smith and Tardif (2009) observed the contribution of BIM to improving communications among business partners at the conceptual stage, and the overall reduction in the cycle time as well as the life cycle cost of a project. In New Zealand, cost estimation is carried out based on 2D drawings (Both, 2012), while in Australia, Aibinu and Venkatesh (2014) reported a low adoption of BIM by Australia's quantity surveyors. One of the factors attributed to the low adoption in Australia was the "lack of trust in the integrity of BIM" and "lack of demand by the clients" among other barriers. Meanwhile, based on the desktop literature, key factors that influence the top management of firms to adopt BIM include its ability to enhance the competitiveness in the market and facilitate the business operation. Utilizing the innovative tools can help the firms to maintain their competitiveness within the industry because BIM can improve project quality and minimize the risks as well as the cost of the construction projects (Epstein, 2012).

CONCLUSION

The review highlighted the main causes of cost overrun in the construction industry. It is generally acknowledged that the end result of cost overrun is costly and risky, leading to many disputes and claims that end in lawsuits. Most of the causes of cost overrun as stated by previous researchers can be classified into four categories. These are contractor's responsibility, consultant's responsibility, owner's responsibility and external factors. It is believed that the evolution of the Building Information Model (BIM) will be able to increase efficiency and quality of output in the construction industry by eliminating these causes of cost overrun. The application of BIM and the potential benefits of its application were also reviewed. The benefits from using these applications are expected to minimize cost overrun as they provide solutions for the main causes of cost overrun such as estimation, clash detection, integration and many more.

REFERENCES

Abd El-Razek, M., Bassioni, H., & Mobarak, A. (2008). Causes of delay in building construction projects in Egypt. *Journal of Construction Engineering and Management, 134*(11), 831–841.

AEC industry. *Leadership and Management in Engineering, 11*(3), 241–252.

Ahmed, S. M., Azhar. S., Kappagntula, P., & Gollapudil, D. (2003). *Delays in construction: A brief study of the Florida construction industry.* Paper presented at the Proceedings of the 39th Annual ASC Conference, Clenson University, Clenson, SC.

Aibinu, A., & Venkatesh, S. (2014). Status of BIM adoption and the BIM experience of cost consultants in Australia. *Journal of Professional Issues in Engineering Education and Practice, 140*(3), 04013021.

Al-Aghbari, M. (2005). *Factors affecting construction speed of industrialized building system in Malaysia*. Serdang, Malaysia: Universiti Putra Malaysia.

Alaghbari, W. E., Razali A., Kadir, M., Salim, A., & Ernawati. (2007). The significant factors causing delay of building construction projects in Malaysia. *Engineering, Construction and Architectural Management, 14*(2), 192–206.

Alinaitwe, H., Apolot, R., & Tindiwensi, D. (2013). Investigation into the causes of delays and cost overruns in Uganda's public sector construction projects. *Journal of Construction in Developing Countries*, *18*(2), 33.

Al-Momani, A. H. (2000). Construction delay: A quantitative analysis. *International Journal of Project Management, 18*(1), 51–59.

Al-Tmeemy, S. M. H., Abdul-Rahman, H., & Harun, Z. (2012). Contractors' perception of the use of costs of quality system in Malaysian building construction projects. *International Journal of Project Management, 3*0(7), 827–838.

Azhar, S. (2011). Building information modeling (BIM): Trends, benefits, risks, and challenges for the

Azhar, S., Hein, M., & Sketo, B. (2008). *Building Information Modeling (BIM): Benefits, risks and challenges.* Auburn, Alabama: McWhorter School of Building Science, Auburn University.

Bazjanac, V. (2006). Virtual building environments (VBE)-applying information modeling to buildings. In A. Dikbas & R. Scherer (Eds.), *eWork and eBusiness in Architecture Engineering and Construction* (pp. 58-72). London: Taylor & Francis Group.

Both, P. V. (2012). Potentials and barriers for implementing BIM in the German AEC market: results of a current market analysis.

Bryde, D., Broquetas, M., & Volm, J. M. (2013). The project benefits of building information modelling

Chan, D. W., & Kumaraswamy, M. M. (2002). Compressing construction durations: Lessons learned from Hong Kong building projects. *International Journal of Project Management, 20*(1), 23–35.

Eadie, R., Browne, M., Odeyinka, H., McKeown, C., & McNiff, S. (2015). A survey of current status of and perceived changes required for BIM adoption in the UK. *Built Environment Project and Asset Management, 5*(1), 4–21.

Enshassi, A., Al-Najjar, J., & Kumaraswamy, M. (2009). Delays and cost overruns in the construction projects in the Gaza strip. *Journal of Financial Management of Property and Construction, 14*(2), 126–151.

Epstein, E. (2012). *Implementing successful building information modeling*. Artech House.

Forbes, L. H., & Ahmed, S. M. (2010). *Modern construction: Lean project delivery and integrated practices.* Boca Raton: CRC Press.

Frimpong, Y., Oluwoye, J., & Crawford, L. (2003). Causes of delay and cost overruns in construction of groundwater projects in developing countries: Ghana as a case study. *International Journal of Project Management, 21*(5), 321–326.

Glick, S., & Guggemos, A. (2009). IPD and BIM: Benefits and opportunities for regulatory agencies. In *Proceedings of the 45th Associated Schools of Construction National Conference* (pp. 2-4). Gainesville, Florida.

Gourlis, G., & Kovacic, I. (2016). Building Information Modelling for analysis of energy efficient industrial buildings – A case study. *Renewable and Sustainable Energy Reviews, 68*, 953-963.

Grilo, A., & Jardim-Goncalves, R. (2010). Value proposition on interoperability of BIM and collaborative working environments. *Automation in Construction, 19*(5), 522–530.

Gündüz, M., Nielsen, Y., & Özdemir, M. (2012). Quantification of delay factors using the relative importance index method for construction projects in Turkey. *Journal of Management in Engineering, 29*(2), 133–139.

Hsieh, T. Y., Lu, S. T., & Wu, C. H. (2004). Statistical analysis of causes for change orders in metropolitan public works. *International Journal of Project Management, 22*(8), 679–686.

Kaliba, C., Muya, M., & Mumba, K. (2009). Cost escalation and schedule delays in road construction projects in Zambia. *International Journal of Project Management, 27*(5), 522–531.

Kerzner, H. R. (2013). *Project management: A systems approach to planning, scheduling, and controlling*.New Jersey: John Wiley & Sons.

Khemlani, L. (2007). Top criteria for BIM solutions. *A survey conducted by AECbytes*.

Lavy, S., Liu, R., & RA Issa, R. (2014). *Design for maintenance accessibility using BIM tools.* Facilities, 32(3/4), 153–159.

Le-Hoai, L., Dai Lee, Y., & Lee, J. Y. (2008). Delay and cost overruns in Vietnam large construction projects: A comparison with other selected countries. *KSCE Journal of Civil Engineering, 12*(6), 367–377.

Lu, Q., Won, J., & Cheng, J. C. (2016). A financial decision making framework for construction projects based on 5D Building information modeling (BIM). *International Journal of Project Management, 34*(1), 3–21.

Martínez-Rojas, M., Marín, N., & Miranda, M. A. V. (2016). An intelligent system for the acquisition and management of information from bill of quantities in building projects. *Expert Systems with Applications, 63*, 284–294.

Masood, R., Kharal, M., & Nasir, A. (2014). Is BIM adoption advantageous for construction industry of Pakistan? *Procedia Engineering, 77*, 229–238.

Masrom, M. A. N., Rahim, M. H. I. A., Mohamed, S., Chen, G. K., & Yunus, R. (2015). Successful criteria for large infrastructure projects in Malaysia. *Procedia Engineering, 125*, 143–149.

Minchin, R. E., Li, X., Issa, R. R., & Vargas, G. G. (2013). Comparison of cost and time performance of design-build and design-bid-build delivery systems in Florida. *Journal of Construction Engineering and Management, 139*(10), 04013007.

Mohandes, S. R., Marsono, A. K., Omrany, H., Faghirinejadfard, A., & Mahdiyar, A. (2015). Comparison of building existing partitions through building information modeling (BIM). *Jurnal Teknologi*, *75*(1), 287-298.

Odeh, A. M., & Battaineh, H. T. (2002). Causes of construction delay: Traditional contracts. *International Journal of Project Management, 20*(1), 67–73.

Olatunji, O., Sher, W., Gu, N., & Ogunsemi, D. (2010). Building information modelling processes: benefits for construction industry. *Paper presented at the W078-Special Track 18th CIB World Building Congress.* Salford, United Kingdom.

Olawale, Y. A., & Sun, M. (2010). Cost and time control of construction projects: Inhibiting factors and mitigating measures in practice. *Construction Management and Economics, 28*(5), 509–526.

Rasdorf, W. J., & Abudayyeh, O. Y. (1991). Cost-and schedule-control integration: Issues and needs.

Rokooei, S. (2015). Building information modeling in project management: necessities, challenges and outcomes. *Procedia-Social and Behavioral Sciences, 210*, 87–95.

Salleh, H., & Phui Fung, W. (2014). Building Information Modelling application: focus-group discussion. *Građevinar*, *66*(08.), 705-714.

Samarghandi, H., Tabatabaei, S. M. M., Taabayan, P., Mirhashemi, A., & Willoughby, K. (2016). Studying the reasons for delay and cost overrun in construction projects: The case of Iran. *Journal of Construction in Developing Countries* (in press).

Sambasivan, M., & Soon, Y. W. (2007). Causes and effects of delays in Malaysian construction industry.

Shehu, Z., Endut, I. R., & Akintoye, A. (2014). Factors contributing to project time and hence cost overrun in the Malaysian construction industry. *Journal of Financial Management of Property and Construction, 19*(1), 55–75.

Smith, D. K., & Edgar, A. (2008). *Building information modeling (BIM).* Washington, U.S.A.: National Institute of Building Sciences.

Smith, D. K., & Tardif, M. (2009). *Building information modeling: a strategic implementation guide for architects, engineers, constructors, and real estate asset managers*. John Wiley & Sons.

Smith, P. (2014). Project cost management – Global issues and challenges. *Procedia-Social and Behavioral Sciences, 119*, 485–494.

Succar, B. (2009). Building information modelling framework: A research and delivery foundation for industry stakeholders. *Automation in Construction, 18*(3), 357–375.

Toor, S. U. R., & Ogunlana, S. O. (2008). Problems causing delays in major construction projects in Thailand. *Construction Management and Economics, 26*(4), 395–408.

Torp, O., Belay, A. M., Thodesen, C., & Klakegg, O. J. (2016). Cost development over-time at construction planning phase: Empirical evidence from Norwegian construction projects. *Procedia Engineering, 145*, 1177–1184.

Underwood, J. (2009). *Handbook of research on building information modeling and construction informatics: Concepts and technologies.* United States of America, USA: IGI Global.

Wong, A. K., Wong, F. K., & Nadeem, A. (2009). Attributes of building information modelling and its development in Hong Kong. *HKIE Transactions, 16*(2), 38-45.

Xiao, H., & Noble, T. (2014). BIM's impact on the project manager. In *Proceedings of the 30th Annual ARCOM Conference* (pp. 693-702). Portsmouth, UK.

Zhang, D. (2012). *Project time and cost control using building information modeling* (Master's Thesis). North Dakota State University of Agriculture and Applied Science, North Dakota, U.S.A. ProQuest LLC, (1550199).

Zhang, D., & Gao, Z. (2013). Project time and cost control using building information modeling. *ICCREM 2013*, 545–554.

CONSTRUCTION PROJECT DELAY MANAGEMENT

Ali Reza Afshari
Department of Construction Management, Shirvan Branch, Islamic Azad University, Shirvan, Iran
E-mail: afshari@mshdiau.ac.ir
Shirin Kardanimalekinezhad
Department of Construction Management, Mashhad Branch, Islamic Azad University, Mashhad, Iran

ABSTRACT

Delay to projects is one of the foremost concerns of the construction industry in Mashhad, Iran. The delays to the projects are affecting the economies throughout the world. Delay to projects mean the slowdown of development in all other related fields. The main aim and objective of this research is to evaluate the various types of delays and the reasons for those delays that are currently affecting the construction projects in Mashhad. Measures from previous researches to reduce or eliminate these delays by methods of mitigation or acceleration are analyzed for the case studies considered for this research. A detailed case study has been carried out for one project in Mashhad, Iran. Case study deals with a project which encountered delays and implemented measures of mitigation and acceleration to reduce the delays. The finding from the case study is that the main delay to the projects is compensable delays or owner caused, as seen case study where the owner delayed the nomination.

Key words: Construction management, Project delay, Construction Project management, Construction industry, Project management.

INTRODUCTION

Projects are envisaged and visualized with the foresight of achieving the primary objective of timely completion. Some projects are planned and executed successfully whereas others get delayed due to reasons, some of which are analyzed and evaluated in this dissertation. Delay to projects is considered to be one of the common problems in the construction industry. Delays have an negative effect on the project in terms of performance, time and cost. Thus, it is essential to identify the types of delays that normally occur in a project. The types of delays can be broadly split in two categories of delay by the client (compensable delays) and the contractor (non excusable delays). The delays can be identified as critical or non critical and whether the delay is concurrent or non concurrent. The identification of the types of delays leads to the reasons of delay. The reasons for the delays are identified so that the effect on construction projects can be reduced. The reasons for delays are client and contractor related. Unreasonable project scope and inadequate early planning are the prime delays by the client. The client interference and delay in the decision making process also major reasons for delays. The client in some cases delays the design or changes the design leading to various other changes like design related changes to drawings and their approval by the authorities. The contractor had delays related to overambitious estimates and incorrect task assessment which lead to delays and affect the project. In case of lack of task clarity, an inexperienced contractor or subcontractor may unknowingly delay the works (Martyr, 2018).

The mitigation of delays can be achieved by adopting the process of knowledge management and project learning which gives insight into the various problems and their solutions. In fact the lessons leant feedback from projects is a real eye opener and helpful for others to avoid similar issues. Prevention of delays by adopting innovative and teamwork helps in planning and analyzing the requirements in detail which will allow the mapping of resources and identifying the risks. The works can then be estimated, allocated and modularized for execution. The issues that can lead to delays need to be escalated, identified and resolved on a priority to ensure that they do not become a reason for

delay. The issue of delay is further researched through case studies. The case study approach is adopted for this research as the issue to a particular project can be analyzed in complete detail. These case study have been taken from live project in the Mashhad, Iran. The case study is a completed project which was delayed due to the client but completed by applying mitigation and acceleration measures. The case study is a failure project as the client abandoned the project by putting the project on hold and introducing a new stakeholder. The methodology for this study takes into account the key data for each project which included the planning methodology, resources monitoring, cost methodology and the critical decisions which are likely to delay the project. The justification for the data considered is provided and further the method of data acquisition and data analysis is detailed to substantiate the methodology. The analysis and of the data provided for the project is analyzed further for case study for their planning, resources, cost and decisions processes. The recommendations for project is given as to what could have been done to mitigate the delays. The knowledge gained in some of the module is applied for recommendations which is applying the knowledge gained in a purposeful manner. Conclusion is listed based on the areas analyzed for the methodology for the case study to allow for better knowledge management in future. The aim of this research was to evaluate the various types of delays that occur in construction projects in Mashhad and the reasons why delays occur and the measures that can be implemented to reduce or eliminate these delays by mitigation or acceleration. To achieve the aim the approach of case study is considered for this research (Harrison et. al, 2017).

LITERATURE REVIEW

Delays are of various types and researchers have their own parameters to rate and identify them. Delays have numerous reasons which vary from project to project and the reasons are different and unique for every project. Efforts to reduce the delay by mitigation or eliminate the delay by acceleration are measures that can be or may be applicable in some cases and will depend on the projects being considered for those measures. Change is the primary cause for a delay. If projects do not have changes then the projects would finish on time as there would be no or little disruptions to the works. The contractors would also like to work on projects where the designs are finalized and there are no changes and disruptions. In a perfect world, all construction projects would finish on time, without changes or disruptions. Despite the common public perception that contractors cannot wait for the changes to start on a project because that is where they allegedly “make their money”, most contractors would prefer their projects to complete without changes (Molner , 2007).

However this is an idealistic situation, in reality changes are inherent to nearly all project of substantial size due to the fact that projects rarely commence after all the designs are completed and approved. It is important that all the key stakeholders for the project agree as to how the changes to the project would be handled and by whom. This is in the interest of the project as beneficial to the owner and the contractor. The continuous striving for improvement makes it necessary to incorporate changes even though they may disrupt the works to a certain extent. However the overall result is likely to be better than the initial after incorporating the changes and the satisfaction of achieving a better final product makes the changes more acceptable rather than no changes at all. The stage at which changes are proposed to be implemented is important as any major changes proposed when the project is in an advanced stage of progress will complicate the works, impact the schedule and likely to cause delays to the completion. The changes will increase the cost of the project as abortive works, modification and changes will come with a cost. Changed work complicates a project, invites delays and increases the project cost, all things that make owners unhappy (Molner , 2007). A literature review for the objectives is done to evaluate the types ,reasons of delay and the methods for the mitigation and prevention of delays. Before determining the impact of a delay on the project, one must determine whether the delay is critical or non-critical. Additionally, all delays are either excusable or non-excusable. Both excusable and non-excusable delays can be defined as either concurrent or non-concurrent. Delays can be further broken down into compensable or non-compensable delays (Kamandang & Casita, 2018).

The reasons for delays are project specific and vary from project to project. We identify the delays generally as well project specific. Projects have a variety of reasons to experience delay. An investigation to find out the reasons for the delays was conducted in Hong Kong where a questionnaire was developed on factors that were identified in previous findings. The analysis of the findings indicated the difference in perception of the factors that was between the key stakeholders of the project. There was general agreement about the relative importance of delay factors such as unforeseen ground conditions (Pall et. al, 2019). The delays can be controlled by improving productivity and factors that affect productivity are dealt with the purpose of further increasing productivity and thereby reducing delays. The conclusion of the investigation is ranking of the factors and factor categories that are considered by various project stakeholders. The areas of disparity between the stakeholders is indicated by their experiences, prejudices and ineffective communication. Thus the project scope factors can be supported by effective communications between all stakeholders. According to Abdalla et al (2002), projects encounter massive delays and thereby overshoot the initial time and cost estimates which in turn result in extensive delays providing a platform for claims and disputes. A survey done with the objective of finding the most important reasons for delays as per the traditional contracts indicate that contractors and consultants agreed that owner interference, inadequate contractor experience, financing and payments, labor productivity, slow decision making, improper planning, and subcontractors are among the top ten most important factors.

Delays to the projects can be reduced by applying measures which can be reflected as mitigation of delays. This mitigation of delays is possible only by re-sequencing of the works where ever possible and without increasing the resources and manpower. The works that can be achieved without any additional cost to the project is the mitigation. The mitigation of delays can be possible by also applying the knowledge gained through previous projects experience and these can be implemented where ever their application can be suited for any specific requirement in the process of project learning. Such knowledge management will help in mitigating delays and the awareness of such knowledge through lessons learnt feedback can in fact be helpful in preventing the delays itself. Delays can be prevented by applying methods which can be implemented from the project commencement itself like planning and analyzing the requirements in detail which will allow the mapping of resources. The risk can be identified to allow the estimation and allocation of works which is required to be modularized. Escalation of issues at the appropriate times also ensures that the delays can be prevented. The prevention of delays is possible when all the project stakeholders work as a team to ensure the success of the project. It is also important for the client to employ a proactive consultant, freeze the design and details before the commencement of the project and employ good reputed contractors for the project (Keng et. al, 2020).

In summary, Delay occurs when the critical activities are affected. This delay is either non contractor caused or client caused, and mostly the delay is concurrent. The delays to projects is primarily emanating from the client due to various reasons like project scope not being finalized at the initial stage, delay in nominating subcontractors at the appropriate time. Delay due to inadequate early planning can be avoided if the client implements risk management systems. Mitigation of delays can be implemented through knowledge management, project learning and the lessons learnt feedback.

CASE STUDY

Projects are conceptualized and implemented with the primary aim of completion in time. Delay to the project is a failure to implement project management principles. However in certain cases the delay is from the primary stakeholder himself. The aim of the case study approach is to evaluate live and completed projects which are undertaken in Mashhad, Iran and understand the types of delay, reasons for the delays and measure to mitigate and eliminate the delays. There are various types of delays to projects and having numerous reasons for every project. Also, every project is unique in its characteristics, priorities and value and benefits. Delay to projects are also a result of various factors related to that project and every delay in a particular project also has various factors and elements which require a detailed study and analysis. A survey with some people may provide some insight into some types of delays for some type of projects and the reasons for those delays. It may not give the entire picture of delays and its reasons ,implications and measures taken to mitigate delays for a particular delay or many delays for a specific project. Also,

complete information related to the delays may not be available for various reasons which may again affect the analysis and the results. Also, a survey is basically gathering information from various sources carrying out a theoretical analysis and deriving results and conclusions. A case based study (Harrison et. al, 2017) is done on a live and completed project which evaluates the entire project and all factors that were responsible to the delay and all the mitigation or acceleration methods adopted to recover from those delays. A case based study of different live projects having experienced different types of delays and different reasons for delays would provide a deeper insight into the problems. Since, these delays have actually taken place, the reactions and solutions would provide a clear idea as which of the theoretical solutions have been implemented or which of the theoretical solutions have failed to succeed.

Case study had all the delay factors like delay from the client, consultant and contractor like Delay in nominations, Delay to progress, Delay to Cash Flow Curve. The delay to the project was 10 months due to the delay in nominations which was the critical delay. Finally, the project was completed 6 months beyond the original completion date with partial mitigation and partial acceleration of 4 months. The client granted the extension of time for the delayed period even though the entitlement was more than the actual time required for the completion of the project. We are going to address a problem which can be considered to be arising from internal factors. The project has section of aluminum works which are required to be nominated by the client as per the conditions of contract. The client has nominated an aluminum company, which is a client group company. There has been a delay in the nomination of the works package. This delay in nomination is likely to delay the completion of the project. The main problem is that the nominated company does not have any production facility and resources in Iran. Hence, in this particular project, we have a planning and a resource management problem. We are going to analyze this issue and the impact of the delay on the overall completion of the project. Also, we will highlight measures to mitigate the delays by providing specific planning and resource management techniques. There has been a delay in the nomination of the works package. This delay in nomination is likely to delay the completion of the aluminum and glazing works and its successor activities.

Project Planning Problem: The program for the works package was delayed and only after much insistence the program done by the aluminum subcontractor on M.S. Project, whereas the Baseline Master Program of the main contractor was done in Primavera Project Planner. Also, the program was not detailed enough for effective monitoring and also since the production facilities were outside the country, information provided was not verifiable. The nominated company has design facilities abroad and no local representation. For any design related issues, the local representative is required to communicate with the design team in Italy, thereby delaying the approval process of the design itself. As the company was proposing a new system of installation, the design and the suitability of the system itself was subject to approvals, verifications and confirmations to give confidence in its implementation. Since, there was a contractual requirement regarding the design to be approved by a third-party consultant, the process was not given priority by the subcontractor. The process of finalizing the third-party consultant and seeking their approval of design came into the picture only after it was brought to the notice of the aluminum subcontractor that this is a requirement as per the specifications and the contract. The consultant had to wait for a long period for the third-party approval who took their required time thus further delaying the approval of design. The submission of the materials was delayed. Since, a new system was being proposed the approval of materials like the aluminum section was required to be done. Materials like glass and aluminum metal cladding were not provided with samples as per the architectural requirements. Delay in procuring specific samples to obtain the approvals delayed the entire process. Also, in case of glass samples the color of the sample glass was not as per requirement thereby affecting the subsequent process of procurement, manufacture and delivery. The process of drawings preparation and approvals were delayed as the preparation of drawings were being done in Italy and the pace of drawings submissions was delayed. Also, the comments by the consultants on the drawings would not be attended quickly as hard copies were commented and there was no provision to incorporate the changes locally thereby delaying the entire approval process. The procurement process was delayed due to the delay in the drawing's approvals process. The production facility is located in Italy. Hence, delay in nomination, material submission and approvals, shop drawing preparation, submissions and approval, delay in procurement ultimately affected the production process. The main factor resulting in delay was that the extrusion for the aluminum was to be done locally and then the extruded material was to be exported to Italy for fabrication and production at

the Italy factory and then again re-exported back for installation. This meant that the process required the export of the raw material and re-export of the finished product as reflected in the flow chart. The production process was also affected due to the summer break in Europe where production is affected for a period of 6 weeks. The production of the aluminum in the factory was initially delayed and further the production was affected due to the summer holidays in Europe in falling the month of august. This affected the production of the sections, frames, mullions, transforms and curtain wall glazing. Since the materials have to be packed and shipped, it requires a further 6 weeks to reach the destination.

Project Resource Management Problem: The company does not have any manpower resources in the local market and since it is newly established company. The lack of resources affected the progress of works even though the overall manpower from the main contractor was less than planned for the major part of the project as reflected in the following manpower histogram. The problem started when the local subcontractors were quoting installation charges which were not in line with the budget considered for the installation. Hence, the process of locating an installation subcontractor within the budget was inexorably delayed. This further added to the initial delays and the delays went on increasing and no mitigation was possible until the problem of manpower required for execution was resolved. The staff required for monitoring and coordinating the works were newly recruited and were not aware of the requirements. Moreover, the lack of coordination between the local staff and the head office was further affecting the progress of works. No progress status was being provided to the local staff regarding the procurement, production and delivery. Hence monitoring of the progress of works related to the design, materials and shop drawings submission was affected and a clear picture was not available at regular intervals thereby reducing the confidence of the consultant regarding the performance of the aluminum subcontractor. Skilled Manpower from Europe who are aware of the installation process and the method of execution are expensive and not accounted for in the resource management plan. Manpower if recruited locally will be required to be given training for the new installation system which will require time, affect quality and will result in low initial productivity thereby resulting in further delay.

Project Cost Management Problem: The works will not be possible to be achieved as per the budget due the delay factors which have contributed to the time, resource and cost planning for the project. Also, certain element of works was quoted not taking into consideration the specification requirements, the alternatives of which was not accepted by the client/consultants who wanted the specifications to be adhered to. The prices of materials and manpower have risen since the project was awarded and due to the delay in design, submission, approvals and production. The prices were also affected due to the boom in the construction industry at that time. There has been a delay in nomination of the aluminum works. The aluminum works subcontractor is a client group company. Since the client wanted to allocate the specific work package to his group company it took time as the quotation form the group company was much higher than the competitors. Also, since the subcontractor was proposing a different system, it was not in line with the project specifications. The delay of nomination was affecting the entire project as the nomination was a critical nomination.

METHODOLOGY

Delay to projects is a result of inaction on part of the key stakeholders in the project. The client as the main stakeholder does not nominate a critical subcontractor on the project gets delayed. The methodology for evaluating the delay to a project is by acquiring all the information related to the project and its success and failure. This key data is related to the planning of the project. The plan that is to be achieved will require resources and cash as part of the requirements. Another major element is the decisions by the client in nominating the key and critical subcontractors which will be required to perform for the successful completion of the project. The key data will be required to be justified for its merits and will have to be tested to verify its usefulness and importance. The method of the data acquisition is important and should be verifiable and substantiated. This data is then analyzed by various methods for accuracy and implementation. The methodology adopted in this research is to identify the key data required for managing the issues of delay. The reasons for delays to projects will be considered based on live project

conditions and the measures to provide the solution to the problems will be from the knowledge gained in the modules and steps taken to implement them to mitigate, eliminate or prevent those delays.

The project is monitored through a program of works which is a set of activities linked together in a proper sequence to evaluate the time required to complete the works in line with the contract duration. This program is then loaded with resources in man days and curve is generated from the man days for all activities for monitoring the progress of works. This curve is called as the progress curve. The project is monitored for progress, by a progress curve generated at the beginning of the project to highlight the rate of progress for the entire duration of the project. The progress curve can also be generated by giving weightage to the engineering and construction process. This is normally done for a design and build projects. Large scale complex projects can also be done with this combination of weightage, but the criteria for the allocation of the weightage is decided at the start of the project. The cost curve or cash flow curve or the gross valuation can be used for monitoring of progress of works, but it is not as accurate as the man-days progress curve. This is the cash flow curve or gross valuation curve based on cost and not on the basis of man-days weightage for the activities of works. In large projects, due to the changing circumstances and requirements it is likely that the decisions taken by the client are delayed. More so if the project is a design and build project. In other projects also, the client expects to take decisions according to his criteria and priorities. It is important to note that the successful completion of any project is related to the decisions by the client at the appropriate time in line with the program of works.

The cash flow for any project is the lifeline as uninterrupted cash flow is required for the success of any project. The value of work in cost is also a critical indicator for the works to be carried out for the project. Any delay for any activities or the billing will immediately reflect on the cash flow of the project. This is suitable method for evaluating the progress of works in small to medium size projects. However, in large and complex projects this is not be a suitable method to monitor progress as it does not identify the critical path and reasons causing the delay. The client may want to change an important decision like he may opt to replace a nominated contractor later in the project as some other party may be willing to execute the works at a much lower cost. From the client's perspective this may make good economic sense but from the projects point it could spell disaster. The client would not have considered that this decision could delay the entire project. Hence, the requirement of decisions by the client in line with the program as per the specified dates of nominations justifies the requirement.

The data acquisition for the planning issues like the Key performance index is the updates of the baseline program. The key performance index is listed as milestones in the program and updated periodically. On a weekly or fortnightly basis, the progress of works at site is recorded and the progress is discussed and agreed with the project team. Then the progress percentages are verified and agreed with the consultant. The progress of works is recorded for both the engineering and construction activities and the baseline master program of works is updated. The Cash Flow curve is normally monitored on a monthly basis as the billing for the project is done every month. The progress of works recorded for the updating the program is utilized for the cash flow update as the bill is updated. The nominations are part of the baseline master program of works which is monitored periodically. The nominations have to be communicated to the contractor by the consultant through the client as the process of nominations is dealt by the client and consultant. Hence information related to the nomination is forwarded to the contractor upon successful selection of the subcontractor.

The updated program of works which is resource loaded will indicate whether the progress of works is in line with the baseline master program of works. The progress curve for the project is monitored periodically and plotted against the baseline progress curve. Any delay compared to the baseline curve is probed further by analyzing the details of progress for activities on the critical path of the project. The cash flow update is compared to the baseline cash flow curve and the information is useful to evaluate whether the cash flow is line with the projections. The information for the cash flow update is from the program updated percentages which are applied to the respective activities in the bill of quantities. The dates for the nominations are planned as per the program and upon updating the program any due nominations are finalized and any nominations pending will reflect a delay. Nomination if critical and not finalized will

reflect a delay on the project and will need to be taken up on a priority. Also, delayed nominations would be dealt with contractually by making extension of time claims pursuant to the conditions of contract.

RESULTS

The analysis of all the factors mentioned in the case study and the methodology will be further analyzed and the results of those analysis will indicate as what was the measure taken to implement the measures like mitigation and acceleration. Example: regression analysis is implemented for case study, planning analysis and is successfully implemented on the project. The analysis takes into consideration the factors that have resulted in the failure of the project in terms of the resource management and cost management. Example: Recovery cost curve proposed to recover the delays based the cash flow analysis. The decisions by the clients are analyzed in each project and the analysis and results indicate that the client as the primary stakeholder holds a greater responsibility for the success or failure of the project. The analysis and results for the case study would be structured according to the methodology.

The selection of the third-party consultant should commence along with the commencement of the design so that the third-party consultant is on board by the time the design is completed and ready for submission. It is recommended that the design done at the head office in Italy should be forwarded to the third-party consultant along with the project consultant so that precious time is saved. Design coordinators should be available in the country to substantiate and clarify the design aspects to the project and third-party consultant until the process of design approval is completed. The approval of the design by the project consultants will not materialize until they have the approval from the third-party consultant. Hence, the third-party consultant contact should specify the time frames within which they will review the design and comment and give the necessary approvals. Since the third-party consultant is appointed by the aluminum subcontractor, they should appoint a third-party consultant which meets their time requirements. The materials submission related to the extruded material should be done on a priority as the extruded material has to be exported to Italy for fabrication. Material samples like glass and metal works can be procured locally or airlifted in case of specific requirements to avoid delay. Preparation of drawings can be split between Italy and employing a local subcontractor for drawings. The delay that occurred in incorporating the comments by the project consultants which took time to be sent to Italy could have been resolved by the local subcontractor who would have been assigned that responsibility, thereby saving a considerable amount of time. The extrusion from the local manufacturers and then exporting to Italy was one of the factors which can be improved by extruding the material from an Italian supplier. It would have reduced the time required for exporting to Italy.

The company can recruit subcontractors and offer a portion of works which can be done to reduce the overall delay, even though the installation charges may not be in line with the budget. However, these will still be cheaper compared to the option of skilled manpower for installation from Europe. Staff from the Italy office needs to have a presence including deployment of permanent staff till the completion of the project. Skilled locally recruited staff having work exposure to multinational companies can be good in coordination and execution. Skilled manpower from Europe can be hired to achieve two objectives; namely training and part section of works. The manpower from Europe would be experienced in this form of installation and would achieve good productivity thereby mitigating some of the delays to the works. The manpower recruited locally can be skilled and exposed to similar work packages to ensure good productivity and quality. Also, subcontractors specialized in these works can be deployed to ensure that the delay to the project is mitigated. The details of the progress of works and its delay even after the revised program was issued were due to the lack of required manpower which has to be obtained locally to meet the targets. The resource analysis reinforced the need for additional manpower to reduce the impact of initial delay. The monitoring of works by the line of balance helped in achieving the recovery plan. Also, the recruitment and training of local manpower helped in mitigating the delay.

The recommendation in regards to the budget is to implement a policy to complete the works in a way which would minimize the negative effects which have arisen due to various factors already occurred. If effective action is not taken to mitigate the delays the conditions of contract clauses related to penalty and

liquidated damages would be more harmful than the reduced level of profit or even loss. Also, it should be remembered that every contract is accompanied by an escalation clause so it may be possible to reduce any losses by making effective utilization of this clause in the contract. The Cost analysis indicated that the cash flow was affected and measures such as acceleration had to be implemented to recover the delays. The client kept the interior design package works as part of provisional sums for which the client has to nominate a subcontractor to carry out the works. Since the project is to handed over to a reputed chain of hotel operator which was not finalized, the final design could be feezed only after incorporating the requirements of the hotel operator. The interior design consultant was also not selected at the time of award of works; hence the interior design concept was not there. Another reason the client could not nominate is the original scope and amount reserved as a provisional sum was found to be falling short to meet the final design as the scope had increased and also the costs had increased due to a boom in the property market. The cost of materials and manpower had increased significantly as the nomination was due later and the quotations were very high compared to the allocated provisional sum value. The nominations delay by the client affected the project and this was tackled by accretion and mitigation measures as highlighted in the planning, resource and cost analysis.

CONCLUSION

Recommendations for the delays of different project will be different. However, some recommendations are similar which are related to the client and contractor. The recommendation for the client is that he should finalize the projects design before commencement of the works and should not make changes to the project unless it is absolutely essential. The recommendations for the contractor are that the contractor should play a proactive and cooperative role in the projects to ensure its successful completion. Notwithstanding the contractual claims if any, the contractor should make all possible efforts to complete the project on time. The conclusions for the case studies are that the client is primarily responsible for the delays that take place in a project. This delay may be due late finalization for nominated subcontractors or non-finalization of designs. The contractor should be also be involved in the process of selection of subcontractors as the ultimate responsibility of completion lies with the contractor

REFERENCES

Abdalla M Odeh, Hussien T Battaineh. (2002) Causes of construction delay: Traditional contracts. International Journal of Project Management. Kidlington: Jan 2002. Vol. 20, Iss. 1;

Harrison, H., Birks, M., Franklin, R., & Mills, J. (2017). Case study research: Foundations and methodological orientations. In *Forum qualitative Social for schung /Forum: qualitative social research* (Vol. 18, No. 1, pp. 1-17).

Kamandang, Z. R., & Casita, C. B. (2018). Delays in Construction Project: A Review. *IPTEK Journal of Proceedings Series*, (6).

Keng, T. C., Ismail, A. S., & Ching, Y. K. (2020). Prelimary Studies of Delays in Construction Projects. *Malaysian Journal of Business and Economics (MJBE)*.

Martyr, T. (2018). *Why Projects Fail: Nine Laws for Success*. Business Expert Press

Molner, B. (2007). Project Delays, Disruptions, and Changes. *Ater Wynne LLP*.

Pall, G. K., Bridge, A. J., Gray, J., & Skitmore, M. (2019). Causes of delay in power transmission projects: An empirical study. *Energies*, *13*(1), 17.

APPLICATION OF IOT TECHNOLOGIES IN THE HEALTH CARE

Ali Reza Afshari
Department of Construction Management, Shirvan Branch, Islamic Azad University, Shirvan, Iran
E-mail: afshari@mshdiau.ac.ir
Sohrab Mohammadi
Department of Computer, Shirvan Branch, Islamic Azad University, Shirvan, Iran

ABSTRACT

The purpose of the IoT is to enable the connection of objects in the environment to interact and collaborate "at any time, any place, with anything and everyone, and make the best use of any route or network and any service". IoT-based health care network of countries play a significant role in information and communication technologies and are involved in the development of medical information systems. The development of IoT-based health care systems should ensure and enhance patient safety, quality of life, and other health care activities. Tracing, routing and monitoring patients and the activities of healthcare actors are challenging research topics. In this paper, we propose the general architecture of a health care system for monitoring at-risk patients in intelligent ICUs. Real-time system tools and alerts, medical assistants will explain changes in vital parameters or patient mobility, as well as significant changes in environmental parameters for preventive measures.

Key words: Internet of things (IoT), Health care, Health Care Network, IoT-based health care.

INTRODUCTION

Currently there are many definitions of Internet of Things (IoT), which may vary depending on the context, the effects and the views of the person giving the definition. The definition of IoT can be “a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual *things* have identities, physical attributes, and virtual personalities” (Chiuchisan, 2014). The Internet of Things offers solutions based on the integration of Information Technology (IT), which refers to hardware and software used to store and process data, and Communications Technology, which includes electronic systems used for communication between individuals. Internet of Things (IoT) is “a new revolution of the Internet”, thanks to the ability to connect remote and mobile things or machines or assets through the use of wireless communications and low-cost sensors, computing and storage devices. So, the Internet is now advancing from a network of computers to a network of things (Gershenfeld, 2004).

The goal of the IoT is to enable a variety of things/objects present in the environment to be connected in order to interact and cooperate “anytime, anyplace, with anything and anyone, ideally using any path or network and any service”. It is estimated that the number of Internet-connected devices exceeds the number of human beings on the planet in 2025. According to Cisco company there will be at least 25 billion Internet-connected devices by 2025 and doubly to 50 billion by 2030 (Quasim, 2021). For every Internet-connected personal computer there will be 5 to 10 other types of devices Internet-connected such as smart phones, gaming consoles, Wi-Fi routers, iPods, smart TV sets, connected stereo systems and other media devices. In the IoT network the things or objects are identifiable and can communicate information about them. The research and development of technologies such as micro- and nano-electronics, communications, sensors, Radio¬frequency identification (RFID), smart phones, embedded systems, cloud computing and software challenges contribute to the creation of a world where the real, digital and virtual are converging to develop smart

environments that produces innovations in many different sectors. Potential applications of IoT are many and diverse, and the main domains are (Vermesan & Friess, 2013):

- **Industry:** which involves financial/commercial transactions between companies, such as smart grid, water flow, liquid presence, tank level, photovoltaic installations, etc.;
- **Environment** which includes activities regarding the protection, monitoring and development of natural resources, such as forest fire detection, air pollution, landslide and avalanche prevention, earthquake early detection, air quality, water quality, water leakages, river floods, etc.;
- **Society** which includes initiatives regarding the development and inclusion of societies, cities and people, such as health care systems, smart parking, traffic congestion, smart lightning, waste management, intelligent transportation systems, etc.

Developing the technology in Europe will be much nearer to implementing smart environments by 2020. In the future computation, storage and communication services will be distributed. People, smart devices, machines, platforms, equipped with wireless sensors or RFID tags, will create a general pool of resources interconnected by a dynamic network of networks. In the following ten years, trillions of sensors will be delivered. These sensors will be used to measure almost everything, from energy use, health conditions, air pollution to acceleration and location etc. Application of IoT technologies in green related and health care applications is one of the most encouraging market segments Shaikh et al., 2015). As it is a technological basis of IoT, research and development is also needed in the area of reconfigurable hardware, such as Field-Programmable Gate Array (FPGA), where the configuration can be changed dynamically in order to introduce useful changes to the required description (Chiuchisan, 2013).

HEALTH CARE AND INTERNET OF THINGS

Advances in information, telecommunication, and network technologies play a significant role in health care systems and have contribution in development of medical information systems. However, health care represents one of the important social and economic challenges that every country faces, and health care administrators, clinicians, researchers, and other health practitioners are facing increasing pressure to adjust to growing expectations from both the public and the private sector. A major impact on the quality of people's life is the rising cost of medical care and these costs are even higher in the case of chronic diseases. The number of elderly is increasing continuously, which puts pressure on social and health services (Tan & Cheng, 2005).

The development of health care systems demands a concerted effort to harness the power of information and communications technologies in the service of health care in order to create more efficient, effective, and secure data sharing, large-scale health information processing, and more effective communications. A number of connected devices have been developed to improve health care delivery using sensors to collect information and cloud hosted analytics software that analyses data. Over the past 10-15 years, health care providers have increasingly become connected through the use of mobile computers, tablets, PCs, smartphones, Wi-Fi phones, and communications badges and help them to become far more proactive about Health Services Delivery (Chiuchisan, 2013). The illustration from Sierra Wireless, showed in Fig. 1, describes how a health care provider could theoretically use real time data collected from hospitals, wearable devices, home health monitoring devices, and elsewhere to provide better services.

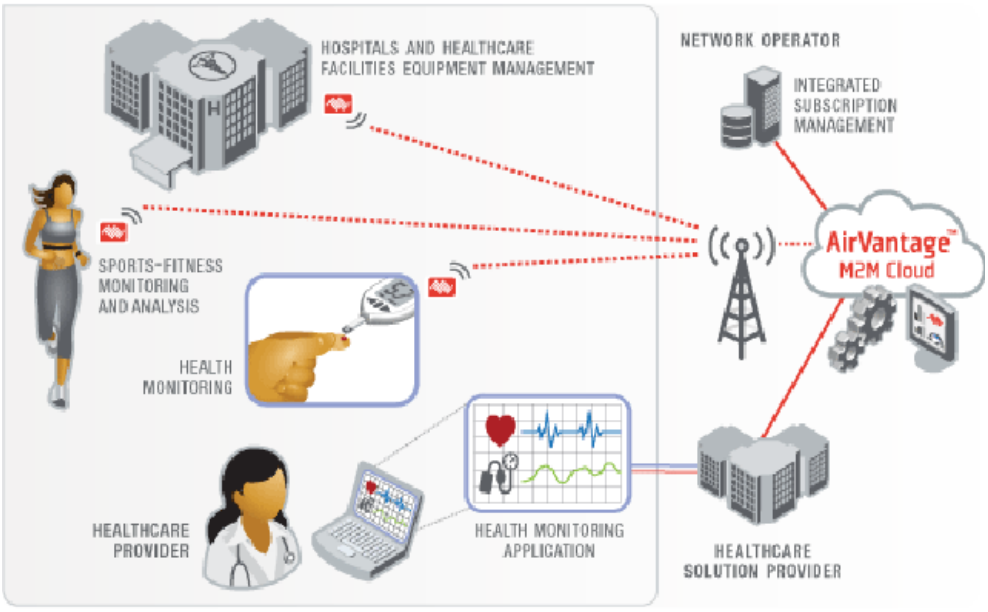


Figure 1: Real time monitoring of patient health through IoT

Many patients who require constant health monitoring prefer the comfort of home monitoring to hospital environment. In case of remote monitoring patients can use a variety of monitoring devices such as glucose meters, pulse oxymeters, weight scales etc. The main difficulty in home monitoring is making patients to provide accurate data to health care specialists. A number of companies are developing further connectivity solutions to improve not only communications between health care givers and patients, but real time monitoring of patient health as well (Zeadally & Sklavos, 2021).

The problems of the Romanian Health System are similar to those of other European countries. In present, Romanian medical sector has not fully embraced the advantages and benefits of recent technologies that are used in health care sector. For instance, the medical staff has to deal with amounts of patient's medical records. The health care services costs are expected to grow due to the aging of the population and the increasing demand on health systems. The new health care systems support the doctors and elderly people or patients with chronic diseases in managing the health care process in order to achieve an optimal health status or to avoid a worsening of the illness as long as possible. Recent evolution in health care domain has consistently shown that combined technologies have the possibility to resolve particular problems of the health domain (Vlădescu, 2009).

HEALTH CARE SYSTEM FOR MONITORING OF PATIENTS

Technological advances in the communication field and embedded systems allow the design and development of mobile communication systems with low power consumption and high computing. These characteristics are essential for the development of mobile health monitoring systems. At the same time, the aging of the population and the prevalence of chronic disease have increased the need for at-home health care, but employing medical personnel will lead to an increase of medical costs. A solution is remote monitoring or tele¬monitoring that helps the physicians to follow up the progress of the patient and decide if a medical assistant or a doctor must be present or if the patient will be transported to another medical facility. In this way patients retain the quality of medical services but at lower cost. In this paper is proposed the architecture of a health care system for monitoring of patients at risk in smart Intensive Care Units, using the concept of Internet of Things. The Intensive Care Unit (ICU) is hospital sector where patients require close observation and need constant attention or special drugs because they may have suffered serious injuries or they may have recently suffered major surgery. The monitoring in the Intensive Care Unit is made through ICU monitors and all patients are connected to a bedside monitor. This monitoring of patients includes diagnosis, monitoring of vital parameters, prevention and treatment of all the vital functions. The patients have different types of

sensors or sensing devices attached to their body which are connected to the ICU monitor by wires. The sensing devices send electronic signals through wires to the ICU monitor. This monitor displays specific signals and can generate alarms, which can signal to the medical staff if a body function needs attention. However, some patient's movements can cause the removal of the sensing devices wires (Dastgerdi, 2020).

The Intensive Care Unit monitor is used for monitoring and recording of, and to generate alarms for, multiple physiological parameters of patients in a hospital environment. The most commonly monitored functions are: breathing rate and oxygen saturation, heart rate and rhythm, blood pressure, body temperature (Drews, 2008). The monitor can store or print the patient reports and is capable of functioning with a wireless infrastructure. In order to monitor the movement of the patients at risk from ICU and create a smart environment we will use the sensors from Microsoft XBOX Kinect. This device has a set of sensors that is able to detect movements, identify faces and recognize speech, through sensors that can acquire image, audio and depth information. The Kinect does not require the patient to wear any kind of sensors or devices. We will use the NUI (Natural User Interface) Skeleton Tracking module that provides a specific class for the management of the properties of the detected skeleton. Kinect can detect at most six skeletons simultaneously, and the number of detected people is limited only by how many they will fit in the field-of-view of the camera. When a patient is detected, he/she is modelled with the class "Skeleton". Class Skeleton has several information fields related to joints, position, tracking, etc. For each joint there are information related to the tracking and the position, in space coordinates x, y and z, and each joint is marked as "tracked" or "inferred" (Vitale, 2012).

In order to monitor the environmental parameters from Intensive Care Unit inside hospitals we will use a board that has sensors integrated to gather the information about the indoor parameters and send it to a Gateway device. The sensors board has been designed to monitor temperature, humidity, atmospheric pressure and different types of gases. As well, movement and vibrations can be measured by the internal accelerometer. The device receives sensor data and forwards them to the Internet via Ethernet, Wi-Fi or GPRS protocols depending on the connectivity options available in that area. In case connectivity fails, data can be stored in an internal data base. The gateway sends the information to the Tunneling machine that will send the information to Servers located on the Internet, where users are connected. All health records and measurements were stored into a computer server and a data base that can be accessed by the doctors/nurses through a user-friendly interface. The web-based health monitoring application will analyze and process the data information from all the devices from ICU and informs in almost real time the doctors about the changing of vital parameter or the movement of the patients and also about the important changing in environmental parameters, in order to take preventive measures (Al Janabi, 2020).

Another useful application of IoT concept is the remote monitoring of human's vital signs, such as blood pressure, electrocardiographic signal, oxygen saturation, body temperature and heart rate. This can be done by means of embedded medical sensors and wireless technology Rotariu et al., 2010).

CONCLUSION

Internet of Things applications are pushing the development of platforms for implementing ambient assisted living systems that will offer services in the areas of assistance in daily activities, health monitoring, enhancing rapid access to medical and emergency systems. In present, the patients monitoring in hospital environment are made by medical personnel in which case the human error is inevitable. In this paper we propose the architecture of a health care system for monitoring of patients at risk in smart Intensive Care Units (ICU) through the Internet of Things paradigm, using the recent methods and devices such as XBOX Kinect and a set of sensors for monitoring of environmental parameters. The main objective of our system is to enhance medical condition for people who need permanent support or monitoring, to decrease barriers for monitoring important health parameters, to avoid unnecessary health care costs and efforts, and to provide the right medical support at the right

time. The authors have achieved system architecture acquiring the hardware parts and configuring the software for XBOX Kinect. The system is in the process of testing and validation.

REFERENCES

Al_Janabi, S. (2020). Smart system to create an optimal higher education environment using IDA and IOTs. *International Journal of Computers and Applications*, *42*(3), 244-259.

Chiuchisan, I. (2013). A new FPGA-based real-time configurable system for medical image processing. In *2013 E-Health and Bioengineering Conference (EHB)* (pp. 1-4). IEEE.

Chiuchisan, I., Costin, H. N., & Geman, O. (2014). Adopting the internet of things technologies in health care systems. In *2014 International Conference and Exposition on Electrical and Power Engineering (EPE)* (pp. 532-535). IEEE.

Dastgerdi, A. K. (2020). A Review on Electronic Health Systems for Remote Monitoring Vital Symptoms of Patients (Case Study: Wireless Body Sensor Networks). *Majlesi Journal of Telecommunication Devices*, *9*(3).

Drews, F. A. (2008). Patient monitors in critical care: Lessons for improvement. *Advances in patient safety: new directions and alternative approaches (vol. 3: Performance and tools)*.

Gershenfeld, N., Krikorian, R., & Cohen, D. (2004). The internet of things. *Scientific American*, *291*(4), 76-81.

Quasim, M. T. (2021). *Challenges and applications of internet of things (IoT) in Saudi Arabia* (No. 5316). EasyChair.

Rotariu, C., Costin, H., Alexa, I., Andruseac, G., Manta, V., & Mustata, B. (2010). E-health system for medical tele surveillance of chronic patients. *International Journal of Computers, Communications and Control*, *5*(5), 900.

Shaikh, F. K., Zeadally, S., & Exposito, E. (2015). Enabling technologies for green internet of things. *IEEE Systems Journal*, *11*(2), 983-994.

Tan, J., & Cheng, W. (2005). E-NETWORKING. *E-HEALTH CARE INFORMATION SYSTEMS*, 163.

Vermesan, O., & Friess, P. (Eds.). (2013). *Internet of things: converging technologies for smart environments and integrated ecosystems*. River publishers.

Vitale, P. (2012). EVALUATION ANDMEASUREMENTS OF KINECTMOVEMENT DETECTION IN PHYSICAL THERAPY.

Vlădescu, C., Galan, A., Olsavszky, V., & Scîntee, S. G. (2009). Romanian health system strategic directions for the next decade. *Italian Journal of Public Health*, *6*(1).

Zeadally, S., Das, A. K., & Sklavos, N. (2021). Cryptographic technologies and protocol standards for Internet of Things. *Internet of Things*, *14*, 100075

CONSTRUCTION PROJECT FINANCING MANAGEMENT

Ali Reza Afshari
Department of Project Management and Construction, Mashhad Branch, Islamic Azad University, Mashhad, Iran
E-mail: afshari@mshdiau.ac.ir
Behsa Saeedi
Department of Project Management and Construction, Mashhad Branch, Islamic Azad University, Mashhad, Iran

ABSTRACT

Project financing continues to enjoy strong growth. Many countries have sought a greater role for the private sector, seeking to balance budgetary constraints against a desire to develop infrastructure, including investment in areas traditionally seen as the domain of the public sector. Project finance is the long-term financing of construction projects based upon the projected cash flows of the project rather than the balance sheets of its sponsors. Project finance is the process of financing a specific economic unit that the sponsors create, in which creditors share much of the venture's business risk and funding is obtained strictly for the project itself. Project finance creates value by reducing the costs of funding, maintaining the sponsors financial flexibility, increasing the leverage ratios, avoiding contamination risk, reducing corporate taxes, improving risk management, and reducing the costs associated with market imperfections. This paper provides details on project finance characteristics and players.

Key words: Construction Project Management, Project Finance, Project Financing Documentation, Project Financial Management.

INTRODUCTION

Before examining how projects are structured and financed, it is worth asking why sponsors choose project finance to fund their projects. Project finance is invariably more expensive than raising corporate funding (Finnerty, 2007). Also, and importantly, it takes considerably more time to organise and involves a considerable dedication of management time and expertise in implementing, monitoring and administering the loan during the life of the project. There must, therefore, be compelling reasons for sponsors to choose this route for financing a particular project. The following are some of the more obvious reasons why project finance might be chosen: The sponsors may want to insulate themselves from both the project debt and the risk of any failure of the project, A desire on the part of sponsors not to have to consolidate the project's debt on to their own balance sheets. This will, of course, depend on the particular accounting or legal requirements applicable to each sponsor. However, with the trend these days in many countries for a company's balance sheet to reflect substance over form, this is likely to become less of a reason for sponsors to select project finance, There may be a genuine desire on the part of the sponsors to share some of the risk in a large project with others. It may be that in the case of some smaller companies their balance sheets are simply not strong enough to raise the necessary finance to invest in a project on their own and the only way in which they can raise the necessary finance is on a project financing basis, A sponsor may be constrained in its ability to borrow the necessary funds for the project, either through financial covenants in its corporate loan documentation or borrowing restrictions in its statutes. The purpose of this article is to address aspects of financing construction projects (Bueno, 2010). More attention is also paid to project financing documents. This paper contributes to the body of knowledge by reviewing existing policies, practices, and research efforts in the area of construction project financing. Meanwhile, the findings from this paper benefit the industry as well, because they are able to provide the practitioners with a holistic view of construction project financing, thereby enhancing their knowledge and skills in this regard.

PROJECT FINANCING IMPLEMENTATION AND MANAGEMENT

The implementation of a project financing is a complicated, time-consuming and difficult operation. For most projects it is a case of years rather than months from inception of the project to reach financial close. It is not unheard of for some complex and, perhaps, politically sensitive, projects to have a gestation period in excess of five years. However, each project will have a unique timetable, driven largely by the particular dynamics and circumstances of the project. With so many parties involved having conflicting interests, the issue of effective project management assumes great significance in most project financings. It does not matter whether the overall responsibility is assumed by the sponsors and their advisers, or by the lenders and their advisers. What is crucial, however, is that one of the influential parties assumes overall control for managing the project from its inception to financial close. Without effective project management, a project can very easily go off the rails, with each of the parties singularly concentrating on issues and documents that are relevant to it. Because of the need to understand all aspects of the project with a view to assessing the overall risk profile, it is often the lenders and their advisers, who are in the best position to manage effectively and steer a project to financial close (Delmon, 2017).

PROJECT FINANCING PARTIES

One of the complicating and interesting, features of most projects is the considerable number of parties with differing interests that are brought together with the common aim of being involved to a greater or lesser extent with a successful project. It is one of the challenges of those involved with a project to ensure that all of these parties can work together efficiently and successfully and cooperate in achieving the project's overall targets. It is inevitably the case that, although all of the parties will share the same overall aim in ensuring that the project is successful, their individual interests will vary considerably and, in many cases, will conflict. With many projects, there will be an international aspect which will involve different project parties located in different jurisdictions and there will often be tensions between laws and practices differing from one country to another. A common feature in many project structures is that different parties will have particular roles to play. This is especially so with many multi-sponsor projects where, for example, one sponsor may also be the turnkey contractor, whereas another sponsor may be the operator and yet another sponsor may be a supplier of key raw materials to the project or an offtake of product from the project. Frequently it is the case and sometimes a requirement of local laws, that one of the sponsors is a local company. Even in those countries where the involvement of a local company is not a requirement, this can have many advantages particularly where the foreign sponsors have limited experience of business practices or laws in the host country. Further, the involvement of a local company offers a degree of comfort, for the foreign sponsors and lenders alike, that the project as a whole will not be unfairly treated or discriminated against. No two projects will have the same cast of "players" but the following is a reasonably comprehensive list of the different parties likely to be involved in a project finance transaction (Steffen, 2018).

PROJECT FINANCING INVESTORS

These are investors in a project who invest alongside the sponsors. Unlike the sponsors, however, these investors are looking at the project purely in terms of a return on their investments for the benefit of their own shareholders. Apart from providing their equity, the investors generally will not participate in the project in the sense of providing services to the project or being involved in the construction or operating activities. Third-party investors typically will be looking to invest in a project on a much longer time frame than, say, a typical contractor sponsor, who will in most cases want to sell out once the construction has been completed. Many third-party investors are development or equity funds set up for the purposes of investing in a wide range of projects and they are starting to

become a valuable source of capital for projects. Typically, they will require some involvement at board level to monitor their investment (Danielis & Rotaris, 2021).

Banks: The sheer scale of many projects dictates that they cannot be financed by a single lender and, therefore, syndicates of lenders are formed in a great many of the cases for the purpose of financing projects. In a project with an international dimension, the group of lenders may come from a wide variety of countries, perhaps following their customers who are involved in some way in the project. It will almost certainly be the case that there will be banks from the host country participating in the financing. This is as much for the benefit of the foreign lenders as from a desire to be involved on the part of the local lenders. As with the involvement of local sponsors, the foreign lenders will usually take some comfort from the involvement of local lenders. As is usually the case in large syndicated loans, the project loan will be arranged by a smaller group of arranging banks. Often the arranging banks are the original signatories to the loan agreement with the syndication of the loan taking place at a later date. In such cases the arranging banks implicitly take the risk that they will be able to sell down the loan at a later stage. However, participating in project financings is a very specialized area of international finance and the actual participants tend to be restricted to those banks that have the capability of assessing and measuring project risks. This is not to say that banks not having these skills do not participate in project financings, but for these banks the risks are greater as they must also rely on the judgement of the more experienced banks. The complexity of most project financings necessitates that the arrangers are large banks with experience in this market, often having dedicated departments of specialists. For the smaller banks with an appetite for this kind of lending, however, there is usually no shortage of opportunities to participate in loans arranged by the larger banks.

Construction Company: In a construction project the contractor will, during the construction period at least, be one of the key project parties. Commonly, it will be employed directly by the project company to design, procure, construct and commission the project facility assuming full responsibility for the on-time completion of the project facilities usually referred to as the “turnkey” model. The contractor will usually be a company well known in its field and with a track record for constructing similar facilities, ideally in the same part of the world. In some large Construction projects, a consortium of contractors is used. In other cases, an international contractor will join forces with a local contractor. In each of these cases one of the issues that will be of concern to both the project company and the lenders is whether the contractors in the joint venture will assume joint and several liability or only several liability under the construction contract. This may be dictated by the legal structure of the joint venture itself. Lenders, for obvious reasons, will usually prefer joint and several liability. Although most projects are structured on the basis that there will be one turnkey contractor, some projects are structured on the basis that a number of companies are employed by the project company to carry out various aspects of the design, construction and procurement process which are carried out under the overall project management of either the project company or a project manager. This is not a structure favored by lenders as it can lead to gaps in responsibilities for design and construction. Lenders will also usually prefer that the project company divests itself of responsibility for project management and that this is assumed by a creditworthy entity against whom recourse may be had if necessary (Ragazzi, 2005).

Experts: These are the expert consultancies and professional firms appointed by the lenders to advise them on certain technical aspects of the project. The sponsors will frequently also have their own consultants to advise them. The areas where lenders typically seek external specialist advice are on the engineering aspects of projects as well as insurances and environmental matters. Lenders will also frequently turn to advisers to assist them in assessing risk in connection with the project. Each of these consultancies' firms will be chosen for its expertise in the particular area and will be retained to provide an initial assessment prior to financial close and, thereafter, on a periodic basis. An important point to note is that these consultancies firms are appointed by and therefore answerable to the lenders and not the borrower or the sponsors. However, the cost of these consultants' firms will be a cost for the project company to assume and this can be a cause of friction. It is usual, therefore, for a fairly detailed work scope to be agreed in advance between the lenders, the expert and the sponsors.

Suppliers: These are the companies that are supplying essential goods or services in connection with a particular project. In a power project, for example, the fuel supplier for the project will be one of the key parties. In other projects, a particular supplier may be supplying equipment or services required during either the construction or the operating phase of the project. Both the contractor and the operator would also fall under this category. Many of the comments made with respect to the contractor and the operator will also apply to the suppliers. However, it is not always the case that the suppliers and for that matter the purchasers are as closely tied into a project structure as, say, the contractor and operator. The lenders may not therefore be in a position to dictate security terms to them to the same extent. Where there is no long-term supplier of essential goods or services to a project, both the lenders and the project company are necessarily taking the risk that those supplies will be available to the project in sufficient amounts and quality, and at reasonable prices.

Purchasers: In many projects where the project's output is not being sold to the general public, the project company will contract in advance with an identified purchaser to purchase the project's output on a long-term basis. For example, in a gas project there may be a long-term gas offtake contract with a gas purchaser. Likewise in a power project the purchaser may be the national energy authority that has agreed to purchase the power from the plant. However, it is not always the case that there is an agreed off taker. In some projects such as oil projects there will be no pre-agreed long-term offtake contract; rather the products will be sold on the open market and to this extent the banks will take the market risk. In some projects essential supplies to the project such as fuel and the project's output are purchased by the project company or, as the case may be, sold on "take-or-pay" terms. In other words, the purchaser is required to pay for what it has agreed to purchase whether or not it actually takes delivery.

Insurers: Insurers play a crucial role in most projects. If there is a major catastrophe or casualty affecting the project then both the sponsors and the lenders will be looking to the insurers to cover them against loss. In a great many cases, if there was no insurance cover on a total loss of a facility then the sponsors and lenders would lose everything. Lenders in particular, therefore, pay close attention not only to the cover provided but also to who is providing that cover. Most lenders will want to see cover provided by large international insurance companies and will be reluctant to accept local insurance companies from emerging market countries. In some industries some of the very large companies have set up their own offshore captive insurance companies, either for their own account or on a syndicate basis with other large companies. This is, in effect, a form of self-insurance and lenders will want to scrutinize such arrangements carefully to ensure that they are not exposed to any hidden risks. In other cases, insurance cover for particular risks either may not be available or may be available only at prohibitive premiums or from insurers of insufficient substance or repute. In such cases the lenders will want to see that alternative arrangements are made to protect their interests in the event of a major catastrophe or casualty.

PROJECT FINANCING DOCUMENTATION

The essence of project financing is the apportionment of project and other risks amongst the various parties having an interest in that project. The way in which this risk allocation is implemented is, essentially, through the complex matrix of contractual relations between the various project parties as enshrined in the documentation entered into between them. There is no general body of law that dictates how projects must be structured or how the risks should be shared amongst the project parties. Rather, each project must fit within the legal and regulatory framework in the various jurisdictions in which it is being undertaken or implemented. Accordingly, the contracts between the various project parties assume a huge significance and it is these documents that are the instruments by which many of the project risks are shared amongst the project parties. As will be apparent, there is no such thing as a standard set of project documents. Each project will have its own set of documents specially crafted for that particular project. Set out below is a brief description of some of the key documents found in many projects financing structures (Morea & Gebennini, 2021).

Pre-Development Agreements: These are agreements entered into by two or more companies that have agreed to undertake a feasibility study in relation to a proposed project. As the arrangements between the parties will not usually be sufficiently well developed to warrant a formal shareholders' agreement, this document can conveniently deal with such matters as initial decision-making and allocation of tasks in relation to investigating a particular project or proposal. Typically, the agreement would be for a limited duration and would be quite specific about the scope of the proposed arrangements and the terms upon which a party could withdraw from the arrangements. It would also deal with appointment of advisers and general cost sharing. One might also expect to see provisions relating to confidentiality and restrictions on competing. Similar agreements may also be entered into where parties join together to bid for a particular contract or concession and do not want to incur the cost or expense of a formal joint venture agreement or shareholders' agreement unless they are successful in their bid.

Joint Venture Agreement: In those projects where the project is being undertaken using a special purpose vehicle owned by two or more shareholders, those shareholders will usually regulate the relationship between them by entering into a shareholders' agreement. On the other hand, where a joint venture structure is used, a joint venture agreement will usually be entered into. A shareholders' agreement in relation to a project will not differ greatly from a shareholders' agreement relating to the ownership of any other company. A joint venture agreement will contain many of the same provisions although will not need to deal with those matters concerning the setting up and management of a special purpose vehicle. It will, however, have to deal with management of the project and voting in connection with the project generally (Dewar, 2011).

Project Loan Agreement: In most projects this will be a syndicated loan agreement entered into between the borrower, the project lenders and the facility agent. It will regulate the terms and conditions upon which the project loans may be drawn down and what items of project expenditure the loans may be used for. The agreement will contain the usual provisions relating to representations, covenants and events of default found in other syndicated loan agreements but expanded to cover the project, project documents and related matters. The provisions relating to the calculation and payment of interest will be similar for standard Euro-currency, loans except that in most projects interest will be capitalized during the construction period or until project revenues come on stream. Repayment terms will vary from project to project and will often be tied to the receipt of project cash flows and/or the dedication of a minimum percentage of the project's cash flow towards debt service. The agreement will normally provide for all project cash flows to flow through one of a number of project accounts maintained by the agent, or a security trustee or account bank, and charged to the project lenders. There will be detailed mechanics relating to the calculation of project cover ratios and the preparation of banking cases and forecasting information with respect to the project. There will also be provision for the appointment of consultants, advisers and technical experts by the project lenders.

Security Documents: The form of these will vary from jurisdiction to jurisdiction and will depend on the nature and type of assets that are the subject of the security. In common, law-based jurisdictions the taking of security in relation to project financing is usually through a fixed and floating charge covering all of the property and assets of the project company. In civil law based and other legal systems, however, the position is usually more complex, with different documents being required for different categories of assets. In those jurisdictions that recognize trusts, it is usually convenient to appoint a trustee, often one of the banks, to hold the security on trust for the lenders as this not only insulates the security from the insolvency of the institution holding the security but also facilitates the trading of rights and obligations by the banks without the risk of disturbing the security. Where a security trustee is appointed by the project lenders, this is usually under a separate security trust deed which sets out the terms of appointment, rights, duties and obligations of the security trustee, as well as provides for the usual indemnity and exculpatory provisions for the benefit of the trustee. Also, the security trust deed may deal with the order of application of payments amongst the various groups of lenders, although this is frequently dealt with in a separate intercreditor agreement. The applicable governing law for a security document will depend to a great extent on the location of the asset over which security is being taken (Dewar, 2011).

CONSTRUCTION PROJECT DOCUMENTS

In many projects, particularly Build-Operate-Transfer (BOT) projects, the concession agreement will be the key project document as it is the document that will vest in the project company the right to explore, exploit, develop or operate, as appropriate, the concession or other relevant rights to the project. At the other end of the spectrum, all that may be needed for a project company to be vested with the necessary legal rights to exploit is a license. On the other hand, in a BOT project, it will invariably be the case that the project vehicle or its sponsors will be granted a concession by the host government or one of its agencies with respect to the project. The concession agreement, often comprising a BOT obligation, but sometimes a build-own-operate obligation, is popular particularly in countries where political or budgetary constraints prevent governments from developing essential and increasingly expensive infrastructure in the public sector (Gorshkov & Epifanov, 2016).

Construction Contracts: In an construction project where the project lenders are taking all or any part of the construction risk, the construction contract will be one of the key project documents. There are a number of standard form construction contracts in use but it is unlikely any of them will be suitable for a project-financed contract without significant amendment. The closest to a suitable international standard contract is probably the "Orange Book" published by FIDIC. The most common arrangement is a turnkey contract, in which a single "general" contractor assumes all risk of on-time completion of a project which meets guaranteed performance standards. In a turnkey contract, the owner specifies overall performance and reliability standards for the plant, and the turnkey contractor assumes full responsibility for design, construction, supply, installation, testing and commissioning of the plant so as to enable it to meet those specified requirements. Subject to important limitations which the contract will contain, the turnkey contractor essentially provides an overall guarantee of the performance of all components and sub-contractors.

As an alternative arrangement to a turnkey contract, sponsors may consider that they have the necessary experience to manage the design and construction of the project facility and may wish to undertake this themselves, or to leave certain responsibilities for it with the project company. Sponsors may perceive that they will be able to achieve an overall cost or time saving if they perform a role in relation to some or all of the design or construction of the facility. If construction management responsibilities are undertaken by the project company or sponsors, lenders will need to be satisfied with their technical capacity and resources. They may wish to have additional sponsor support to ensure adequate cover against the absence of a single contractor that has overall responsibility and the likely consequences of mismanagement during design and construction. Even less popular with lenders is a project management structure whereby a project management agreement is entered into with one project managing company which will then arrange for individual contractors to enter into contracts with the project company. In this case each of these individual contractors would carry out different parts of the project. One of the reasons lenders have a very strong preference for turnkey contracts is that they reduce the risk of claims arising between the different contractors and of unallocated responsibilities relating to the project. If a turnkey contract is not utilized, then the project lenders will need to spend considerably more time analyzing the construction contracts and the risks arising from the construction arrangements.

Operating and Maintenance Agreements: Once the project is completed and commissioned it will then move into the operation stage. The operation of most projects will require an experienced and skillful operator and the performance of the operator in the performance of its tasks will be crucial to the overall success of the project. Both the project company and the lenders will be keen to ensure that the chosen operator is a company that has a proven track record of operating similar projects. Sometimes it is the case that the project company itself will operate the project although the lenders will want to be satisfied that it has both the experience and the necessary staffing, in place to undertake this role. More often, the operator is a third party that specializes in project and facilities

operation and management and who will enter into an operating and maintenance agreement on arm's-length terms with the project company.

CONCLUSION

This paper has provided a guideline to project financing by outlining key features of various documents that are often found in successful projects. Project financing is an area which requires some degree of experience. Professional accountants, lawyers, and bankers may provide useful assistance to a client or customers contemplating a project financing either as a developer or as a lender or investor in a project. For example, the professional can assist a client or customer in developing the forecasted statement of operating revenues and expenses which is required by lenders and investors as part of the evaluation package for a project finance loan or equity investment. In addition, the professional can assist a client or customer in selecting the business form in which the project will operate. Careful structuring is necessary in order to achieve the most efficient use of tax benefits which are often of major concern to the equity investor in the project. It is important to remember that a successful project financing is executed as a team effort involving a developer, one or more lenders, equity investors, and a variety of advisors ranging from investment bankers to attorneys, engineers, and accountants.

REFERENCES

Bueno, J. C. (2010). Project Finance: Challenges and Trends. In *10ª Conferência Internacional da LARES. LARES. São Paulo*.

Danielis, R., & Rotaris, L. (2021). Transport Project Financing.

Delmon, J. (2017). *Public-private partnership projects in infrastructure: an essential guide for policy makers*. Cambridge university press.

Dewar, J. (Ed.). (2011). *International project finance: law and practice*. Oxford University Press

Finnerty, J. D. (2007). *Project financing: asset-based financial engineering* (Vol. 386). John Wiley & Sons.

Gorshkov, R., & Epifanov, V. (2016). The mechanism of the project financing in the construction of underground structures. *Procedia Engineering*, *165*, 1211-1215.

Morea, D., & Gebennini, E. (2021). New Project Financing and Eco-Efficiency Models for Investment Sustainability. *Sustainability*, *13*(2), 786

Ragazzi, G. (2005). Tolls and project financing: a critical view. *Research in Transportation Economics*, *15*, 41-53.

Steffen, B. (2018). The importance of project finance for renewable energy projects. *Energy Economics*, *69*, 280-294.

TIME MANAGEMENT SKILLS - A CRITICAL ADVANTAGE IN PROFESSIONAL AND PERSONAL DEVELOPMENT

Zorana Antić
Belgrade Business and Arts Academy of Applied Studies, Belgrade, Republic of Serbia
Srđan Bogetić
Belgrade Business and Arts Academy of Applied Studies, Belgrade, Republic of Serbia
E-mail: sbogetic@yahoo.com

ABSTRACT

In the contemporary business environment, accomplishing good results and achieving business performance usually imply time management skills and practices, which generally means that tasks and business activities are performed efficiently and effectively. Time management is critical to achieving success and good performance in any activity - both business and private. Bearing in mind that research has shown that everyday work consumes a significant amount of time, as well as a lot of energy, it is necessary to find a way to achieve a balance between work and private life. Improving the quality of life is essentially the goal of both personal development and the application of time management skills. For that reason, it is necessary to constantly improve knowledge and skills, including the skills of effective time management. Mastering this skill enables achieving better results both on a business and individual level, but also improving personal performance related to behaviour, which results in a change of attitudes and mindsets, thus enabling individual development.

Key words: Time management, Employees, Performance improvement, Personal development, Training.

INTRODUCTION

Success and development, both at the business and individual level, require permanent alternating practice in education and training, i.e. acquiring and constantly innovating wider knowledge relevant to the activities and goals of the organization (Pržulj, 2002) as well as improving employee performance by enhancing specific knowledge, abilities, skills or behaviours, with a present temporal dimension being taken into consideration (Goldstein et al., 2002). When individual learning results in a change in attitudes, values, mindsets, we talk about individual development, whereas organizational learning is most often defined as a change in cognitive structures and behaviours of members of an organization, leading to an increased ability of the organization to adapt to the environment (Janićijević, 2006).

Modern business operations require employees to be active participants and initiators in improving their knowledge and skills, personal and business performance, business activities, business processes, products or services. As the success of the organization depends mostly on the knowledge, skills, creativity and motivation of its employees, it is necessary to constantly improve their qualifications (possession of appropriate education, training and skills to perform a particular job) and competencies (ability to apply knowledge, skills and behaviour in practice to achieve the desired goals). Thus, employees must possess or develop competencies that enable them to perform work tasks, as well as contribute to their personal development (for example, through the development of communication and time management skills) (Chisholm, 2021).

EFFECTIVE TIME MANAGEMENT

The term "time management" first appeared in Mackay's 1959 book “The Management of Time” (Ötken et al., 2020). Mackay's time management model suggested the use of time logs as an effective way to track

managers' use of time. The goal was to ensure that the manager uses his or her time for those activities that are in line with business goals. Back in 1967, in his work "The Effective Executive in Action", Drucker also emphasized the importance of time management as a key factor for the success of managers, where he also warned of the dangers of wasting time and the consequences of constant busyness. In the 1960-1970 time period, improving the use of time was exclusively aimed at executives or managers, not employees (McNamara, 2010).

Both in practice and literature, the time dimension of work has become increasingly important due to the expansion of global competition and increasing demands for the immediate availability of products and services. As a result, many researchers (Garhammer, 2002) point to a change in the pace of life which is reflected in the tendency for activities to be performed faster, for more activities to be realized simultaneously or for inadequately planned time for the realization of many activities. On the other hand, studies show that the cause of a disturbed balance between business and private life problem lies in the constant pressure to do too much in too little time (Major, et al., 2002).

The growing importance of time, as a resource, is reflected both in theory and in practice. Numerous authors emphasize the need to include time in theoretical models and research design, as well as the need to discover and improve the way people in organizations manage their time (Ancona et al, 2001). Continuous pressure to perform activities for a shorter time period can be minimized by good time management practices and the nurturing of work environment support.

Time management, in business terms, is a process of identifying needs, setting goals, setting priorities and planning tasks that lead to the achievement of organizational goals (Sahito, 2017), i.e. it is a process that should take place in accordance with the requirements of different tasks and activities to ensure the success of the organization and maximize benefits, by spending time and energy rationally. At the personal level, time management aims to provide sufficient time for personal development and achieving personal development goals using successful planning and executing activities in a timely manner.

Effective time management presupposes using time in an optimal way in order to increase productivity and success. It requires work schedule management to achieve organizational and personal goals through advanced planning, organization, and implementation. The skill of time management is a critical advantage for both individuals and organizations because it concerns the use of efficient methods and techniques that ensure the completion of tasks in the required time and the required quality. As it is human nature to schedule time according to interest and comfort, people both at work and outside of it tend to spend the most time on simple tasks. However, the only way to develop good skills and habits for achieving professional and personal success is - time management.

Effective time management enables (Forsyth, 2010): higher productivity, efficiency and effectiveness; greater focus on self-directed tasks and facilitating working methods (for example through creativity); higher probability of achieving goals; higher probability of long-term development (professional and personal); greater satisfaction with the work or activities performed; balance between business and family obligations.

Since time management directly affects results and efficiency, it has a direct impact on career advancement, i.e. personal development, because good time management practice not only affects the organization through the work of the individual and the results he or she generates but also affects the individual - improves work satisfaction, state of mind and general well-being.

TIME MANAGEMENT SKILLS

The annual survey of the LinkedIn business network for 2019 showed that time management is one of the five best and most desirable "soft skills" in 2019 and among the five most desirable skills on the labour market for the same year (Charlton, 2019). Research conducted among students in the United States has revealed that they single out management skills, interpersonal skills, teamwork and time management as

the four most important skills they believe they need in order to land a job after graduation (Kay et al, 2011). A survey conducted among students of the Aarhus University's technical faculties in Denmark has found that students' ability to set goals and prioritize activities, as well as their own perceived time control - time management activities have had the most significant positive correlation with the semester and cumulative grade point average (Adams et al., 2019).

There are numerous research studies (Aeon et al., 2017) that deal with the skills underlying time management. Here, time management is defined as a decision-making process that structures, protects, and adjusts an individual's time in changing environmental conditions. There are three particularly important skills that separate successful from unsuccessful time management (Erich et al., 2020):

- awareness: realistic understanding of your time realizing that it is a limited resource;
- management: creating and organizing goals, plans, schedules and tasks in order to use time efficiently;
- adaptation: monitoring the use of time during activities, including adjusting, interrupting or changing priorities.

The aforementioned abilities that make up successful time management were tested on a sample of 1200 respondents and the results indicate the following (Erich et al., 2020): (1) all three abilities are equally important for the overall performance of time management. Therefore, only improving one's planning and organization (i.e., management skills) ignores two-thirds of the competencies needed for effective time management and will not result in mastering time management skills; (2) awareness and adaptation scores were on average 24% lower than management ability scores. This result suggests that awareness and adaptation are not only abilities that are less common but are more difficult to develop naturally, without direct intervention. In addition, the developed awareness was the primary indicator of successfully overcoming procrastination in the realization of tasks and goals, and the developed ability to adapt - the primary indicator of successful prioritization of tasks and activities; (3) the results contradict popular statements about both the advantages and disadvantages of multitasking. When asked how respondents feel while performing several activities at the same time, the answers indicated that their preferences for performing multiple tasks (what academics call "polychronicity") were not actually related to time management skills. How well or poorly people managed their time was not correlated to their preferences for performing multiple tasks. Therefore, multitasking and promoting this ability is not a good way to master the skill of time management; (4) the results obtained provide evidence that people cannot accurately assess their own time management skills. Less than 1% of respondents achieved approximate scores in self-assessment measures in contrast to objective assessment measures on the development of time management skills. These results confirm the previous finding on the lack of developed awareness in people regarding their own competencies, which affects personal and business achievements, but also the potential for personal and professional development.

THE IMPACT OF TIME MANAGEMENT SKILLS ON PERSONAL AND PROFESSIONAL DEVELOPMENT

The performance of any organization largely depends on the techniques and tools applied by employees, which should also be flexible enough and adaptable to change, while at the same time achieving organizational goals (Cannon, 1996). In this context, several researchers have argued that effective time management is a key factor in determining organizational performance and can thus contribute to an organization's profitability (Sutharshini, 2019). In the business world, time is, in addition to knowledge, one of the most important resources. Looking at it this way, several researchers point out that effective time management can improve an organization's performance (Grissom, 2015). Therefore, we can say that the efficiency of the organization depends on the effectiveness of the use of time. Every executive, and especially every managerial position requires that tasks be completed on time, so in order to gain a competitive advantage, organizations face numerous appeals to increase their productivity, to seriously approach efficiency advancements and improve time management, to be more creative and more innovative (Fourie, 2013).

Permanent improvement of business effectiveness and efficiency is one of the requirements of the ISO 9000 standard, as well as one of the principles of quality management that promote continuous improvement of knowledge and skills of employees at all levels, in order to advance the organization's performance. Requirement 7.2 of the ISO 9001 standard emphasizes the importance of competence for achieving the goals of the organization and states that competence (based on appropriate education, training or experience) affects the performance and effectiveness of an organization (ISS, 2015).

The Collection of European Statistics (European Communities, 2004) on how Europeans spend their time, published in 2004, aims to shed light on how women and men organize their daily lives in ten European countries and provide information on opportunities to reconcile work and private life. The statistical sources used for this publication were national surveys on the use of time conducted in ten European countries: Belgium, Germany, Estonia, France, Hungary, Slovenia, Finland, Sweden, the United Kingdom and Norway. Time use surveys, among other things, offer an indicator of participation and time spent learning[1] among people aged 20 to 74. The figures for the average day of the year are very low. Participation rates and average time are approximately the same in all countries surveyed, but slightly less learning time is observed in Estonia and the United Kingdom. There are small differences between women and men. In Sweden, Slovenia and Finland, women learn slightly more than men. No clear differences can be observed in other countries. These gender differences apply only to education at school and university. Leisure studies do not show such differences. The study has clearly focused on young population groups. Between 30 and 50% of members of the youngest age group of 15 to 24 spend some time studying on average. That time is longer in Belgium and France, and shorter in Estonia and the United Kingdom than in the other six European countries. There is a clear decline in the time spent learning after the early 20s. Compared to other countries, people continue to study until later in life in Sweden and Finland. This may be due to different school systems, the possibility of combining studies with employment or later employment.

In its report on the use of time, the U.S. Bureau of Labor Statistics (U.S. Bureau of Labor Statistics, 2021), presents data for the 2019-2020 period and states that Americans spend an average of 28 minutes a day on educational activities. Here, too, it can be seen that teenagers spend much more time learning, with boys learning 3 hours and 37 minutes a day, and girls an average of 2 hours and 29 minutes.

In their report on the use of time for the population over 15 years of age, published in 2008, including data for 2006 as well, the Australians (Australian Bureau of Statistics, 2008) state that the amount of time spent on educational activities in 2006. was an average of 30 minutes per day, similar to the 1992 survey and more than 15% of the 1997 survey. In 2006, men and women spent a similar amount of time on education, both as a whole (30 minutes each) and in each age group, and for both sexes, the time spent decreased as age increased. For men aged 15 to 24, an average of 2 hours and 23 minutes a day was spent on education, and for women 2 hours and 22 minutes. In the next age group, it drops to 12 minutes for men and 15 minutes for women.

Taking into account all theoretical assumptions and literature sources on the topic of time management, but also studies on the use of time (both national surveys on the use of time and time monitoring studies at the individual level), a study was conducted involving 53,957 participants, which allowed for a much more precise, quantified assessment of the effectiveness of time management compared to qualitative reviews and in 2021 a meta-analysis was published (Aeon, et al., 2021) offering the most comprehensive and accurate assessment of time management so far. This meta-analysis shows that time management has a moderate impact on performance at work, distinguishing between results-based performance and behaviour-based performance. The results-based performance measures performance as an outcome (e.g. performance appraisal by supervisors) while the latter measures performance as behavioural contributions (e.g. motivation, job involvement). Time management is associated with both types of performance. Furthermore, this meta-analysis has shown that the effect of time management on performance is somewhat higher in the academic environment compared to the business one. There is a noticeable

[1] Learning time includes school and college learning, homework, and leisure education. Training during working hours was not included. Norway was not included due to a lack of information on leisure learning.

difference in performance improvement here, as the impact of time management on behaviour-based performance has been shown to be much greater than on results-based performance. This finding suggests that results-based performance in the academic environment is less dependent on time management than it is in the business environment.

Time management has a slightly stronger impact on the general well-being than on performance, as shown by the results of data analysis. This conclusion seems unexpected at first glance, given that the dominant discourse indicates to a greater extent that time management is a skill for professional career development, and to a lesser extent - a skill that achieves general well-being, improves quality of life and reduces stress. The authors of the meta-analysis conclude that the fact that time management has a stronger impact on general well-being does not in the least diminish the importance of time management skills in achieving business performance. On the contrary, this finding calls into question the notion that time management is more efficient for work than for other areas of life. This is supported by the data from the report - the effect of time management on life satisfaction is 72% greater than the effect on job satisfaction.

The skill of time management does not generally depend on individual differences. Age, for example, has almost no correlation with time management, whereas gender is weakly correlated with this skill, so women have a slightly higher ability to manage time than men. The link between gender and time management skills is weak, but women's time management has been shown to go stronger over the years. This is probably not due to women's increasing ability to develop this skill over time, but more related to the fact that women now have more freedom than before to manage their time. Other demographic indicators, such as education and the number of children, appeared to have no relevance. As can be seen from the above, the most comprehensive meta-analysis has shown that time management has an impact on work performance, academic achievement, i.e. learning and personal development and general well-being, i.e. the quality of life. Thus, by mastering the skill of time management, it is possible to influence all three outcomes that play an important role in the life of every human being.

CONCLUSION

If we start from the assumption that time management involves the process of deciding on needs, setting goals to meet those needs, setting priorities and planning tasks necessary to achieve these goals, then the fact is that time management represents a key factor in improving individual performance, and hence personal development. In an organizational context, time management is the ability to properly plan and organize time to improve effectiveness and efficiency. Time management has been shown to mean the ability to consistently use time to perform immediate tasks and work on long-term goals, and furthermore, employees with better time management skills allocate the time they have differently depending on job requirements (Sutharshini, et al, 2019). Therefore, time management is a key factor for improving professional performance, i.e. for organizational development. Due to all of the above-mentioned facts, individuals should focus on improving their own time management skills in order to complete their tasks and duties on time. Organizations, on the other hand, need to focus on reducing the stress that employees have at work and achieving a balance between business and private life, then on increasing employee productivity and job satisfaction, by encouraging the improvement of individual performance. All of the above can be achieved by mastering the skill of effective time management.

REFERENCES

Adams, R., Blair, E., (2019), Impact of Time Management Behaviors on Undergraduate Engineering Students' Performance, original research, *SAGE Open*, January-March 2019: 1–11, DOI: 10.1177/2158244018824506

Aeon B, Faber A, Panaccio A (2021) Does time management work? A meta-analysis. PLoS ONE 16(1): e0245066. https://doi.org/10.1371/journal.pone.0245066

Aeon, B., Aguinis, H., (2017), It's About Time: New Perspectives and Insights on Time Management, *Academy of Management Perspectives*, Vol. 31, No. 4, 309–330.

Ancona, D.G., Goodman, P.S., Lawrence, B.S. and Tushman, M.L. (2001), "Time: a new research lens", *Academy of Management Review*, Vol. 26, pp. 645-63.

Australian bureau of statistics, *How Australians use their time* (2008), preuzeto sa https://www.abs.gov.au/statistics/people/people-and-communities/how-australians-use-their-time/latest-release#data-download

Cannon, R., (1996), Time Management: A Review of Issues and Strategies for Academic Staff, *Overview-University of Wollongong Teaching & Learning Journal*, Vol. 3, No. 1, pp. 37-44.

Charlton, E., (2019), These are the 10 most in-demand skills, according to LinkedIn, *World Economic Forum*, preuzeto sa https://www.weforum.org/agenda/2019/01/most-in-demand-skills-as-per-linkedin/

Chisholm L., Fennes, H., (2021), *Competence development as workplace learning in Asia and Europe: Introduction*, preuzeto sa https://asemlllhub.org/wp-content/uploads/2021/06/resources_2165.pdf

Erich C. Dierdorff, E., (2020), Time Management Is About More Than Life Hacks, *Harvard Business Review*, January 2020.

Forsyth, P., (2010), *Successful Time Management*, Kogan Page, London and Philadelphia, pp. 145

Fourie, I.,Fourie, H., (2013), "Getting It Done on Time", *Library Hi Tech*, Vol. 31, No. 2, pp. 391-400

Garhammer, M. (2002), "Pace of life and enjoyment of life", *Journal of Happiness Studies*, Vol. 3, pp. 217-56.

Goldstein I.L & Ford K.J. (2002).*Training in organizations – needs assessment, development, and evaluation*,4 th edition, Wadsworth, Belmont., p.1

Grissom J A, Loeb S , Mitani H (2015), "Principal Time Management Skills: Explaining Patterns in Principals' Time Use, Job Stress, and Perceived Effectiveness", *Journal of Educational Administration*, Vol. 53, No. 6, pp. 773-793.

How Europeans spend their time Everyday life of women and men, (2004), Office for Official Publications of the European Communities, preuzeto sa https://ec.europa.eu/

https://business.linkedin.com/talent-solutions/blog/trends-and-research/2018/the-most-in-demand-hard-and-soft-skills-of-2018

Janićijević, N., (2006), Organizaciono učenje u teoriji organizacionih promena, originlani naučni rad, *Ekonomski anali* 171. str. 7-31, preuzeto sa http://www.doiserbia.nb.rs/img/doi/0013-3264/2006/0013-32640671007J.pdf

Kay A. Hodge, Janet L. Lear, (2011), Employment Skills for 21st Century Workplace: The Gap Between Faculty and Student Perceptions, *Journal of Career and Technical Education*, Vol. 26, No. 2, Winter, 2011, Pp.28-41

Major, V.S., Klein, K.J. and Ehrhart, M.G. (2002), "Work time, work interference with family, and psychological distress", *Journal of Applied Psychology*, Vol. 87, pp. 427-36.

McNamara, P., (2010), *Factors influencing the time management behaviours of small business managers*, Business HDR Student Conference 2010-13. 3.

Ötken, B., Bayram, A., Göl Beser, S., Kaya, C., (2020), Are Time Management and Cyberloafing Related? Investigating Employees' Attitudes, *Global Business Review*, 1-13.

Pržulj Ž. (2002). *Menadžment ljudskih resursa*, Institut za razvoj malih i srednjih preduzeća

Sahito, Z., Vaisanen, P., (2017), Effect of Time Management on the Job Satisfaction and Motivation of Teacher Educators: A Narrative Analysis, *International Journal of Higher Education*, Vol. 6, No. 2, pp. 213-224

SRPS ISO 9001 Sistemi menadžmenta kvalitetom – Zahtevi, ISS, 2015.

Sutharshini, B., Thevanes, N., Anton Arulrajah, A., (2019), Effective Time Management as a Tool for Individual and Organizational Performance in Financial Institutions, *The IUP Journal of Organizational Behavior*, Vol. XVIII, No. 2, pp. 25-41.

U.S. Bureau of Labor Statistics, *American Time Use Survey Summary – may to december 2019 and 2020 results*, (2021), July 22, preuzeto sa https://www.bls.gov/news.release/atus.nr0.htm

ANALYZING RESPONSIBILITY AND SUSTAINABILITY AS ASPECTS OF THE MANAGEMENT PROCESS IN ENTERPRISES

Dejan Đorđević
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
Mihalj Bakator
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
E-mail: mihalj.bakator@uns.ac.rs
Dragan Ćoćkalo
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
Cariša Bešić
University of Kragujevac, Faculty of Technical Scienses Čačak, Republic of Serbia
Ljiljana Đorđević
Serbian Environmental Protection Agency, Republic of Serbia

ABSTRACT

Sustainability of conducting business is an imperative in the modern business environment. In order to achieve a competitive position on the market, companies have to act responsible and to address sustainability when it comes to preservation of the natural environment. The new conditions of conducting business dictate new challenges for companies. Economic goals have to be in accordance with sustainable development goals. This requires companies to increase and adequately practice corporate social responsibility along with sustainable development. In this paper, social responsibility and sustainable approaches to conducting business are analysed. The main goal of the paper is to highlight the importance of responsible business practices and sustainable strategies for achieving competitiveness. The paper discusses suggestions and guidelines for improving competitiveness of domestic companies through responsibility and sustainability. The paper provides an important overview on how the new business environment and changes on a global scale affect how companies conduct business.

Key words: Responsibility, Sustainability, Management processes, Organization, Business.

INTRODUCTION

The accumulated problems in the environment, which are the result of industrial society and industrial decay, have influenced the need to talk more about the responsibility of modern business organizations at the global and national levels. From the aspect of development priorities, preservation of natural resources, and especially the rational use of all resources and their potentials, has acquired strategic importance. On a global level, guidelines for sustainable development are defined, which should establish a balance between the goals of economic development on the one hand and social development on the other hand, taking into account the necessity for improving and protecting the environment. All this influences business entities to be more serious about meeting the goals of a larger number of interest groups in their environment, especially local communities. According to the World Economic Forum (WEF, 2019), it has become clear that the issue of the environment, social and economic development must be considered together in terms of forming a single agenda for action. The process of managing the organization in the conditions of dynamic market changes requires the right way of thinking, in order to achieve new value for all stakeholders. Business organizations have become fully aware of the impact on society and the environment in which they conduct their business. This knowledge has far-reaching consequences. The implementation of corporate ethics principles also has a global character. The public interest is the primary interest of the organization, which must be built into the business policy of the organization, and this has to be viewed as a strict guideline for future business actions.

According to some understandings (Acharol, & Kotler, 2012), the new philosophy implies improving the well-being of society and consumers in relation to the well-being of marketing management. The key issues of global marketing will be the issue of sustainability and the issue of poverty reduction. According to Kotler et al. (2014), sustainability, which implies the ability to meet the needs of humanity without harming future generations, is a priority for many companies. Raising the level of corporate social responsibility requires action in three directions, which include legal, ethical, and socially responsible behaviour.

In this paper the social responsibility and sustainability are analysed and discussed as two main factors in the modern business environment. The main goal of the paper is to provide an overview on the new conditions of conducting business where responsible business strategies and sustainable approaches are an imperative. The consists of three main sections (excluding the Introduction and Conclusion sections). First, social responsibility and its importance in modern business is analysed. Next, sustainability in the context of conducting business is addressed. The third section discusses suggestions and guidelines for improving competitiveness of domestic enterprises through responsible business practices and sustainable strategies.

SOCIAL RESPONSIBILITY AS A PREREQUISITE OF MODERN BUSINESS

Modern business philosophy implies that a company must be responsible for its actions and consequences of these actions towards everyone in the environment. Drucker (2003) believes that focusing on contribution is key for achieving effectiveness. An effective person focuses on contributing from both an economic aspect and a social aspect as well. His emphasis is on responsibility and that commitment to contribute has to include effective accountability. The company is obliged to meet all the requirements of consumers, society, partners, workers and shareholders. It is believed that the modern understanding of responsibility implies responsibility in the domain of economy, environment, and society (Doshmanli et al., 2018; Lankoski, & Smith, 2021).

In the past, it was enough for the company to meet the basic economic goals - profit, as a basis for achieving the goals of growth and development, and today the modern business organization has to meet the requirements of all stakeholders. According to Kotler et al. (2014), raising the level of social responsibility requires action in three directions, which include legal, ethical, and socially responsible behaviour. Businesses must practice social responsibility through their legal, ethical, and social expression and action.

Corporate Social Responsibility (CSR) is linked to the 1980s, when the focus of philanthropy was on corporate ethics. Current trends in the field of good business practice relate to issues that refer to human rights, environmental protection, consumer protection, anti-corruption, and support for social problems (Bogetić et al., 2018). Total Quality Management (TQM) has incorporated the requirements for social responsibility. According to this management model, business organizations should be responsible for environmental protection, consumer protection, protection of workers' interests, and improvement of labour productivity, and knowledge of all employees.

Achieving the goals of business excellence presupposes a built-in corporate social responsibility. It is a voluntary commitment of an organization and its decision to select and apply contributing business practices. Some of the reasons for the application and development of corporate social responsibility are the following: increasing market share, strengthening brand position, strengthening corporate image, improving the ability to attract and motivate employees, reducing business costs, increasing attractiveness to investors.

The concept of corporate social responsibility is now standardized and is an integral part of integrated management systems. The International Organization for Standardization has published ISO 26000 providing guidelines for corporate social responsibility (CSR). The ISO 26000 standard is aimed at

companies of all types, in the public and private sectors, in developed and developing countries. ISO 26000 adds value to the existing CSR initiative by ensuring harmonization, complying with global guidelines based on international consensus and key stakeholder expert groups (Martis, 2018). This way, the application of best practices in CSR worldwide are encouraged. ISO 26000 aims to help organizations contribute to sustainable development. The intention is to encourage business organizations to do more than what it implied and enforced by law.

The concept of quality management integrates the need for environmental protection. This doesn't only refer to the living environment, but also the improvement of people's health as employees and as consumers. The ultimate goal of applying the TQM concept is to achieve the overall quality of life (TQL - Total Quality of Life) (Đorđević, & Ćoćkalo, 2007). These goals are directly based on the concept of sustainable development. On the other hand, the integration of management standards creates the preconditions for achieving the goals of business excellence and sustainable development.

According to some understandings (Bešić, & Đorđević, 2015), the goal of social responsibility is to contribute to sustainable development. The performance of an organization in relation to the society in which it operates, as well as its impact on the environment, has become a crucial part of measuring overall performance and its ability to operate continuously and effectively.

SUSTAINABILITY AND BUSINESS ORGANIZATION MANAGEMENT

A modern business organization does not have to be socially responsible, but rather it must be in line with the main principles of sustainability. Changes on the global market, rapid technological progress, changes in competitive relations, as well as the consequences of the COVID-19 pandemic have influenced the fact that modern business organizations have to conduct business in accordance with the principles of sustainability.

In creating value, companies must focus on meeting the requirements of all stakeholders in the business environment - employees, consumers, suppliers, business partners, the local community, etc. The company should incorporate this principle into its long-term business policy. Furthermore, the company serves its customers by providing value that best meets the needs of consumers and users more broadly. The company should treat its employees with respect and dignity. In that sense, the company should encourage diversity and enable employees to constantly improve working conditions. When it comes to suppliers, the company should treat them as real business partners in the value creation process. The company serves society through its activities that support local development and pay poster taxes. Also, the company needs to constantly innovate and invest in sustainability, and managers are agreed to create long-term value.

The next phase of technology and economy development is the fifth industrial revolution - Industry 5.0. It is believed that Industry 5.0 will be determined by rediscovered expediency, which goes beyond the process of manufacturing or providing services. In this sense, Industry 5.0 sub-includes three main elements: human focus, sustainability, and resilience (European Commission, 2020a). Doing Business in Industry 5.0 will involve creating such business models that include the constant growth of business productivity and the creation of competitiveness, but also the need to create environmental and social value.

The Global Framework for Skills Development in the 21st Century (ILO, 2021) proposes the need to raise environmental awareness and respect and readiness to learn about sustainable development, which is the starting point for every citizen of the world who wants to facilitate a greener way of thinking, living and acting. Moving to a sustainable environment will require basic skills, such as improving efficiency and waste prevention, adaptability, teamwork, communication, negotiation, analytical and innovative thinking, basic digital skills, literacy, strategic thinking and leadership. The development of these skills will play a key role in industrial green restructuring, structural change, and

"greening" of existing jobs. In Table 1. practices and business factors in the domain of sustainability and responsibility are presented.

Table 1: Sustainability and responsibility model

Observed business factor	Practice
Environmental management	– energy conservation – pollution prevention – environmental protection – sustainable transport and logistics – reduction of carbon footprint
Human resource management	– securing jobs – creating jobs – providing opportunities – training and development opportunities – employee health and safety management – optimal work-life balance for employees
Marketing	– truthful advertising – fair pricing – customer credit – after sales service quality – public integrated reporting
Operations management	– total quality management – innovations – outsourcing – pay invoices early and on time – evaluating and identifying inefficiencies – research and development – recycling and reusing
Internal control systems	– management control system – accounting management – strategic control – corporate governance
Regulatory stakeholders	– comply with legal and regulatory policies – issue and conflict resolution via dialogues and discussions
Communities	– conflict and issues resolution via discussions and dialogues – sponsor education – providing training opportunities – support local activities
Shareholders	– generating profit
Customers	– meet requirements – exceed expectations and needs
Suppliers	– responsible procurement – optimized supply chains – safeguard human rights – sustainable material use

(Source: Camilleri, 2017; Liakh, & Spigarelli, 2020)

Based on the presented information in Table 1., it is evident that responsibility and sustainability include a large array of business practices across various business factors. This extensive list indicates the already stated notion that achieving competitiveness in accordance with responsible business practices and sustainable strategies is indeed challenging for companies. The challenges are even more difficult for domestic enterprises as factors of a transitional economy also takes its toll on sustainable development.

SUGGESTIONS AND GUIDELINES

Economic development must be in line with social development and the protection and improvement of the environment. In 2020, the World Economic Forum published the Davos Manifesto, which is a set of ethical principles for managing companies in the age of the fourth technological revolution - Industry 4.0. This document is based on principles such as (WEF, 2020):

- Companies should pay fair taxes;
- Companies should show zero tolerance for corruption;
- Uphold human rights through their global supply chains and advocate for a competitive economy.

In addition, it is necessary to mobilize companies and socially responsible entrepreneurs in order to protect the environment. The main notes of the mentioned document are:

- The purpose of the company is to engage all forces in creating sustainable value;
- The company is more than an economic organization that aims to increase continuously profits;
- A company operating in the global market and itself becoming a stakeholder.

The company's performance must be measured not only in relation to the classic economic indicators of the organization's quality, but also in terms of sustainability and environmental impact, social development, and good governance goals at the level of state administration. According to the European Commission (European Commission, 2020b), several goals need to be met in the near future including strengthening sustainable competitiveness, ensuring social justice, building resilience.

In sum, it is suggested that domestic enterprises should conduct business within legal procedures, tax legislation, regulatory policies, reduce corruption rates, advocate and adapt to a competitive economy, create and provide value to customers and users, build resilience to turbulent market dynamics, act responsible to local communities, and strive towards fully sustainable business strategies.

CONCLUSION

Social responsibility is one of the pillars of the organization's business excellence. In the future, it is necessary to achieve sustainable productive economic growth, which is key to improving the lives of individuals. On the other hand, modern business organizations must turn to sustainability. Economic goals, such as productivity and competitiveness, should not take precedence over environmental and social goals.

It can be concluded that business performance must be measured not only in relation to classical economic indicators, but also in terms of sustainability and impact on the environment and social development. This can be achieved only through the application of business models, which incorporate the need to create environmental and social value. For future research, it is recommended to conduct a thorough meta-analysis in the domain of responsibility and sustainability of conducting business.

ACKNOWLEDGEMENT

This work is a part of the current project TR-35017 funded by Ministry of Education, Science and Technological Development of the Republic of Serbia.

REFERENCES

Acharol, R.S., & Kotler, P. (2012). Frontier of the marketing paradigm in the third millennium, *Journal of Academic Marketing Science*, *40*(1), 35-52. https://doi.org/10.1007/s11747-011-0255-4

Bešić, C., & Đorđević, D. (2015). *Corporate social responsibility* (In Serbian: Korporativna društvena odgovornost). Čačak: FTN.

Bogetić, S., Đorđević, D., Ćoćkalo, D., & Vorkapić, M. (2018). Corporate social responsibility as a factor of global competitiveness. *Journal of Engineering Management and Competitiveness (JEMC), 8*(1),11-19.

Camilleri, M. A. (2017). Corporate sustainability and responsibility: creating value for business, society and the environment. *Asian Journal of Sustainability and Social Responsibility, 2*, 59-74. https://doi.org/10.1186/s41180-017-0016-5

Đorđević, D., & Ćoćkalo, D. (2007). *Quality management* (In Serbian: Upravljanje kvalitetom). Zrenjanin: TF Mihajlo Pupin.

Doshmanli, M., Salamzadeh, Y., & Salamzadeh, A. (2018). Development of SMEs in an emerging economy: does corporate social responsibility matter?. *International Journal of Management and Enterprise Development, 17*(2), 168. https://doi.org/10.1504/IJMED.2018.090827

Drucker, P. (2003). *The Essential Drucker* (In Serbian: Moj pogled na menadžment). Novi Sad: Adižes.

European Commission (2020a). *Industry 5.0 – Towards a sustainable, human-centric and resilient European industry*. https://ec.europa.eu/info/news/industry-50-towards-more-sustainable-resilient-and-human-centric-industry-2021-jan-07_en

European Commission (2020b). *Program veština za Evropu za održivu konkurentnost, socijalnu pravednost i otpornost*. http://www.as.edu.rs/pdf/articles/481

Global framework on core skills for life and work in the 21st century, (2021), ILO, Switzerland.

Kotler, P., Keller, K. L., & Martinović, M., (2014). *Marketing management* (In Croatian: Upravljanje marketingom). Zagreb: Mate.

Lankoski, L., & Smith, N. C. (2021). Corporate Responsibility Meets the Digital Economy (May 14, 2021). *INSEAD Working Paper No. 2021/23/ATL*. https://ssrn.com/abstract=3845940 or http://dx.doi.org/10.2139/ssrn.3845940

Liakh, O., & Spigarelli, F. (2020). Managing Corporate Sustainability and Responsibility Efficiently: A Review of Existing Literature on Business Groups and Networks. *Sustainability, 12*(18), 7722. https://doi.org/10.3390/su12187722

Moratis, L. (2018). Signalling Responsibility? Applying Signalling Theory to the ISO 26000 Standard for Social Responsibility. *Sustainability, 10*(11), 4172. https://doi.org/10.3390/su10114172

World Economic Forum – WEF (2019). *The Global Competitiveness Report 2019*. https://www.weforum.org/reports/how-to-end-a-decade-of-lost-productivity-growth

World Economic Forum – WEF (2020). *The Davos Manifesto*. www.weforum.org https://www.weforum.org/agenda/2019/12/davos-manifesto-2020-the-universal-purpose-of-a-company-in-the-fourth-industrial-revolution/

RISK ANALYSIS AND RISK MANAGEMENT IN BUSINESS PRACTICE

Biljana Maljugić
Student at University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Republic of Serbia
E-mail: biljanamaljugic28@gmail.com
Marija Matotek Anđelić
Technical College of Applied Studies in Zrenjanin, Republic of Serbia
SrđanaTaboroši
Student at University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Republic of Serbia

ABSTRACT

Sudden and frequent changes in the market have conditioned the growing importance of risk management. Given that small and medium enterprises are "weak" to change and react badly in crisis situations, risk analysis is especially recommended. The risk management process optimizes business decisions in accordance with the identified risks in order to control risk and reduce consequences. Ten risks per medium-sized enterprise and their values are tabulated in the paper. The FMEA method was applied for risk analysis in the implementation of ISO 9001:2015 in a company that is not subject to standardization. The introduction of standardization carries certain acceptance risks that can be appropriately minimized in a timely manner and directed towards more stable operations.

Key words: Risk analysis, Criteria, Methods, Standardization, Risk management.

INTRODUCTION

In an unpredictable global environment, which is subject to daily changes, the company's business is subject to various risks that need to be identified in a timely manner. Udovičić and Kadlec (2013) state that risks in a business organization are closely related to the decision-making process and that the most important thing is to manage risks properly. Operational or business risks occur due to inadequate management, ie errors in the work of company and employee management, based on incorrect assessments, omissions in information, inadequate work procedures and internal decision-making (Merkaš, 2018).

The risk management process according to Pongrac and Majić (2015: 97) is a process by which risks are identified, assessed and analyzed using frequent and repetitive procedures to generate a report and monitor risk activities. Risk management does not eliminate risks, it creates an environment for making optimal business decisions based on the identified risks and the consequences that these risks can cause. After identifying the risk and performing the procedures, it is very important to choose the appropriate technique for the best ways to eliminate or control the risk exposure. In transition economies, as is the case in the Republic of Serbia, it is very important to determine the risks to the company's operations. Risk identification is a process that should be carried out continuously due to the company's exposure to various threatening environmental influences. Impacts can impair the company's ability to perform its activities and achieve its strategic, financial and operational goals (Lutovac, Živković, and Jović, 2020). Čupić (2015), based on theoretical research and the above arguments in his work, confirmed that management can maximize the value of a corporation if it optimizes its exposure. In particular, the author confirmed their hypothesis that "risk management can contribute to maximizing the value of the corporation if it allows maintaining risk exposure at an optimal level, where the benefits outweigh the costs of risk management" (Čupić, 2015: 220). When talking about strategy management in medium-sized companies in the Republic of Serbia, Lutovac,

Živković, and Jović (2020) talk about business risk management. It is strategically very important to first consider and measure the amount of risk that is acceptable for the company's operations, and then determine the risks that can be controlled with available resources.

RISK ANALYSIS

Risk analysis criteria

In order to find out what the risk is, Adamović et al. (2008) responded by asking three questions that need to be answered: "1. What can happen? 2. How often does it happen? 3. What are the consequences if this happens?" (according to Nikolić, 2012: 50). An adverse event is associated with the first question, the probability of an event with the second, and the consequences with the third question. Based on the probability of the occurrence of a harmful event and the severity of the consequences of that event, the risk is defined by the mathematical product of these two quantities (Nikolić, 2012: 50). Čupić et al. (2001) refer to a risk analysis procedure consisting of seven steps: "1. Identifying the criterion variable and the relevant variables that affect it; 2. Description of the possibility of measuring all variables; 3.Examining and establishing dependency-independence relationships between variables; 4. Estimating the probability distribution for all variables that affect the criterion variable; 5. Determining the probability distribution of the criterion variable, using the probability distributions obtained in step 4; 6. Application of Monte Carlo simulation to obtain a satisfactory probability distribution of the criterion variable; 7. Evaluation of the project with the use of information on the distribution of the probability of the criterion variable"(according to Nikolić, 2012: 51). Adamović et al. (2008) point out two basic approaches that determine risk analysis: qualitative and quantitative. What both approaches have in common is that two estimates need to be made: an assessment of the probability of the event occurring and an assessment of the consequences of the event. In the qualitative approach, the probability of a phenomenon is described by the words: very rare, rare, probably, very probable, and the consequences: insignificant, minor, significant, critical, catastrophic. In the quantitative approach, the probability of occurrence of the event and the consequences of the event are expressed by numerical values (according to Nikolić, 2012: 63).

Risk assessment criteria

Table 1: Probability of occurrence / typical evaluation criteria

Qualitative evaluations	Quantitative evaluations	Criterion
very rare	P<0,1	the estimated probability of occurrence does not exceed 10%
rare	0,1<P<0,4	the estimated probability of occurrence does not exceed 40%
probably	0,4<P<0,8	the estimated probability of occurrence does not exceed 80%
very probable	P>0,8	the estimated probability of occurrence exceeds 80%, the probability of recurrence is less than 10 years.

Source: Adamović et al. (2008, according to Nikolić, 2012: 63)

Table 2: Consequences of occurrence / typical evaluation criteria

Qualitative evaluations	Quantitative evaluations	Criterion
insignificant	C<0,1	minimal or insignificant consequences
minor	0,1<C<0,4	the consequences slightly affect the process being analyzed
significant	0,4<C<0,8	the consequences greatly contribute to the increase in costs
critical	0,8<C<0,9	the consequences seriously jeopardize the process and staff
catastrophic	C>0,9	catastrophic consequences for the company, the environment and people.

Source: Adamović et al. (2008, according to Nikolić, 2012: 64)

Adamović et al. (2008, according to Nikolić, 2012: 65) point out that qualitative risk analysis can be matrixed on the basis of previously set criteria and obtained values for assessing the probability of risk occurrence and the value of consequence assessment.

Table 3: Example of a dimensional risk matrix 4 x 5

Probability of occurrence	Very possible	Low	Middle	High	High	High
	Probably	Low	Middle	High	High	High
	Rarely	Low	Low	Middle	Middle	High
	Very rarely	Low	Low	Low	Low	High
		Insignificant	Minor	Significant	Critical	Catastrophic
		Consequences of occurrence				

Source: Adamović et al. (2008, according to Nikolić, 2012: 65)

Quantitative risk analysis according to Nikolić (2012: 65) is realized on the basis of assigning quantitative values of the probability of an event and the consequences of the same event in order to calculate the risk factor. When there are a large number of identified risk situations, the method significantly defines the priorities of activities. The equation for calculating the risk factor is as follows: RF = P x C, where: RF - risk factor, P - probability of occurrence, C - consequence of occurrence.

Risk analysis methods

Adamović et al. (2008, according to Nikolić, 2012) single out several methods for risk analysis. It is important to say that the division of methods into qualitative and quantitative. In relation to the systemic approach to risk identification, methods can be deductive and inductive. Some of the most important methods for risk analysis are (according to Nikolić, 2012):

- PHA (Preliminary Hazard Analysis)
- HAZOP (Hazard and Operability Analysis)
- FMEA (Failure Mode and Effect Analysis)
- FMECA (Failure Mode, Effect and Criticaly Analysis)
- ETA (Event Tree Analysis)
- FTA (Fault Tree Analysis)
- Metod Markova
- PRA (Probabilistic Risk Assessment)

In practice, FMEA analysis is mostly used (Nikolić, 2012; Džudović, Đurić, & Smiljanić, 2018). Depending on the specific problem of risk analysis, the most widely used in business practice were the analysis of the manner, effects (and criticality) of failure (FMEA and / or FMECA) and analysis of the fault tree (failure) (FTA) (Džudović, Đurić, & Smiljanić, 2018).

RISK MANAGEMENT

ISO 9001:2015

According to the revision of the ISO 9001:2015 standard, the key requirements relate to "risk-based thinking" (according to Džudović, Đurić, and Smiljanić, 2018: 164). At the core of this concept is proactive action, to consider and analyze everything that can have an impact on business. In accordance with business goals and strategies, it is necessary to use and control and take the necessary measures and actions (Džudović, Đurić, and Smiljanić, 2018: 164).

Standard ISO 31000

Grozdanović and Stojiljković, (2013: 49) according to ISO 31000:2009 state the principles and guidelines for the implementation of standards, which include five phases: "communication and

consulting, establishing context, risk assessment, risk treatment, monitoring and reporting". Identification, analysis and evaluation activities are defined in the risk assessment phase.

ISO 31000:2018 is a new version of the Risk Management standard. Provides recommendation and guidelines for managing the risks faced by organizations. The guidelines can be applied and adapted to any organization and its context. The ISO 31000:2018 standard does not specify industries or sectors but is intended and provides a common approach to the management of any type of risk. It can be applied in all business activities and decision making at all levels (ISO). Business organizations that have implemented ISO 31000:2018 in their business have better adapted to the situation of the sudden economic crisis due to the COVID-19 pandemic (Maljugić, & Matotek-Anđelić, 2021).

Risk audit

The risk changes over time. Significant events are monitored by the auditors. This includes "analysis of new official documents, external reports, media coverage and changes in the legal framework" (IA COP, 2014: 31). The IA COP (2014) recommends that formal risk assessments be updated annually. In addition, it is necessary to revert to the performed risk factor scoring in order to see whether the priority of the subject of the audit has changed during the year (IA COP, 2014: 31).

EXAMPLES FROM BUSINESS PRACTICE

Identified risks in medium - sized enterprises in the Republic of Serbia

Lutovac, Živković, and Jović (2020) presented six groups that can gather important information to identify most of the risks that pose a threat to the operation of the company. Groups for gathering information on potential risks for the company, which help top management in making decisions that include possible risks, are the following: external and internal auditors, government agencies, friendly companies with which the company exchanges information, associations of which the company is a member or observer (Lutovac, Živković, and Jović, 2020: 106).

In 2019, a survey was conducted and 35 medium-sized companies in the Republic of Serbia were surveyed. Based on the results of this study, Lutovac, Živković, and Jović (2020) presented the importance of nominal risk expression in medium-sized enterprises in the Republic of Serbia based on risk presentation and nominally obtained mean values showing risks to medium-sized enterprises. They suggested 10 possible risks for medium-sized companies. The categorization of the risk interval was done in the manner of 1-10, where the highest risk is defined by size 10, and the lowest risk by size 1.

Table 4: Basic risks for a medium-sized company

Ordinal number	Basic risks identified by internal audit	Nominal presentation of mean values related to individual risks
1	Reputation risks	6
2	Operational risk	6
3	Strategic risk	8
4	Risks associated with the rules already adopted in the company	5
5	Social risk	5
6	Risk related to contracts concluded in the company	4
7	Financial risk of the company	10
8	Management risk	9
9	Company regulatory risk	5
10	Technological risk of the company	7

Source: Lutovac, Živković, and Jović (2020: 107)

Application of Risk Management in a telecommunications company

The FMEA method was applied in the risk analysis of the implementation of ISO 9001 in a telecommunications company. The procedure includes establishing a framework, risk assessment and risk treatment (Džudović, Đurić, and Smiljanić, 2018).

- **Establishing a framework** is the scope of risk identification and analysis. In the specific case in the implementation of the risks identified in the introduction of quality system management.
- **Risk assessment** involves three steps: risk identification, analysis and assessment (according to Džudović, Đurić, and Smiljanić, 2018: 165).
  In the introduction of quality system management, it is necessary to identify sources of risk: financial, cultural, infrastructural, legal, market and operational risks. Risk analysis generates information for risk assessment. Risk assessment contains three levels: risky, medium risk and low risk. It is necessary to define the estimates of the probability of the event, the severity of the consequences of the event and the possibility of detection. An overview of the risks that can be identified at the beginning of the implementation of ISO 9001 is presented in Table 3. Džudović, Đurić, and Smiljanić (2018: 166) recommend that a risk assessment be performed for each phase of implementation and that risk be treated to a minimum. The standard scales for FMEA were used in the analysis, with the scale of assessing the possibility of detection being modified in 1 to 5, and the applied formula for calculating the risk is: Risk= Probability * Consequence * Detection.

Table 5: Application of the FMEA method in risk assessment in the implementation of requirements ISO 9001

ON	**Risk (description of the risk with the cause and potential consequences on the process)**	**Risk level**				**Risk management plan with a description of measures of additional mechanisms for identified risk (avoidance, reduction, transfer, acceptance)**	**Residual risk**			
		P	C	D	R= P*C*D		P	C	D	RPN= P*C*D
1	Inadequate organizational structure and systematization of jobs	4	6	2	48	Create a new organizational structure and adapt the systematization to new needs	1	3	2	6
2	Weak commitment of the organization's management to the introduction of QMS	8	7	3	168	Present the benefits to management, a case study of an organization that has successfully implemented and made a leap in business	3	4	2	24
3	Not understanding the system by employees	7	9	4	252	Present the benefits to employees, a case study of an organization that has successfully implemented and made a leap in business and provided employees with better working conditions	3	4	2	24
4	Insufficient motivation of employees to participate in the introduction of the system	4	8	3	96	Organize with the management to motivate employees to participate in the introduction	3	3	3	27
5	Poor process definition	3	9	2	54	Hold training on processes, process definition, task activities and input and output activities	1	3	2	6

Source: Džudović, Đurić, and Smiljanić (2018: 166)

- **Risk treatment** is a part of risk management that refers to measures to reduce or eliminate risks (Džudović, Đurić, and Smiljanić, 2018). Based on the ISO 31000 standard (AS / NZS ISO 31000, 2009, p. 9) the same authors state in their paper that risk treatment is essentially a process of the

cycle that contains: "assessing the risk treatment, deciding whether the permitted levels of risks are tolerable, and if not, creating a new risk treatment and assessing the effectiveness of that treatment" (according to Džudović, Đurić, and Smiljanić, 2018: 166).

Risk reduction can be achieved with the help of several options: "model construction, instruction, training, preventive actions" (according to Džudović, Đurić, and Smiljanić, 2018: 166).

CONCLUSION

Risk management in business organizations is one of the priorities of management in order to achieve the goals of the organization. Unpredictable changes in the environment can disrupt business systems, so risk priorities are set in order to optimize business. Risk management is important to apply in small and medium enterprises that do not have high resilience to new and sudden changes. Although financial risk, in the opinion of managers, carries the greatest value, technological risk also includes activities of priority that need to be implemented in domestic companies.

Making business decisions in accordance with standardized management, ISO 9001:2015 in the example of a telecommunications company, can be presented and applied in all companies for the need to implement international standards.

REFERENCES

Adamović, Ž., Jovanov, G., Radojević, M., & Meza, S. (2008). *Upravljanje rizikom.* Zrenjanin: Tehnički fakultet „Mihajlo Pupin“.

Čupić, M., Tummala, R., & Suknović, M. (2001). *Odlučivanje: formalni pristup*. Beograd: Fakultet organizacionih nauka.

Čupić, M. (2015). Upravljanje rizikom i vrednost korporacije. *Ekonomski horizonti*, *17*(3), 215-228.

Džudović, S., Đurić, M., & Smiljanić, L. (2018). Menadžment rizika i znanja kao osnova sistema menadžmenta kvaliteta u telekomunikacionoj kompaniji. *Zbornik Međunarodnog kongresa o procesnoj industriji–Procesing*, *31*(1), 163-172.

Grozdanović, M., & Stojiljković, E. (2013). *Metode procene rizika.* Niš: Fakultet zaštite na radu.

IA COP- Internal Audit Community Of Practice (2014). *Procena rizika u planiranju revizije*. Zajednice prakse za internu reviziju (ZPIR).

ISO - ISO 31000:2018 - Risk management - Guidelines, 2018., Dostupno na: https://www.iso.org/standard/65694.html, poslednji put posećeno:19.09.2021.

Lutovac, M., Živković, A., & Jović, Ž. (2020). Identifikacija rizika u procesu odlučivanja top menadžmenta kao trajan proces edukacije u srednjim preduzećima u Republici Srbiji. In *IX međunarodna naučna konferencija Jahorinski poslovni forum 2020: Realni i finansijski sektor u svijetlu novih tehnologija, novih svijetskih kretanja i novih izazova* (pp. 105-109).

Maljugić, B., & Matotek-Anđelić, M. (2021, October 07-08). Analysis of the application of International Standards in business practice. *XI International Conference Industrial Engineering and Environmental Protection (IIZS 2021),* University of Novi Sad, Technical Faculty “Mihajlo Pupin”, Zrenjanin, Serbia.

Merkaš, Z. (2018). Rizici globalnog poslovnog okruženja–izazovi prve četvrtine 21. stoljeća. *Zbornik sveučilišta Libertas*, *3*(3), 95-106.

Nikolić, M., (2012). *Metode odlučivanja.* Zrenjanin: Tehnički fakultet „Mihajlo Pupin“.

Pongrac, B., & Majić, T. (2015). Upravljanje poslovnim rizicima. *Tehnički glasnik*, *9*(1), 94-98.

Udovičić, A., & Kadlec, Ž. (2013). Analiza rizika upravljanja poduzećem. *Praktični menadžment: stručni časopis za teoriju i praksu menadžmenta*, *4*(1), 0-0.

THE ANALYSIS OF OPPORTUNITIES TO USE THE LEAN CONCEPT IN CONDITIONS OF INDUSTRIAL PRODUCTION

Vladan Paunović
University of Kragujevac, Faculty of Technical Sciences, Čačak, Serbia
E-mail vladan.paunovic@ftn.kg.ac.rs
Jasmina Vesić Vasović
University of Kragujevac, Faculty of Technical Sciences, Čačak, Serbia
Sanja Puzović
University of Kragujevac, Faculty of Technical Sciences, Čačak, Serbia

ABSTRACT

This paper presents the impact of the Lean concept on the efficiency of order delivery to customers. The paper aims to demonstrate the benefits of implementing a Lean concept in production organizations to meet customer requirements. The Lean concept gives the company the ability to shorten the order execution time, to have higher quality and lower prices - differences that separate one supplier from another. Because the impact of the Lean concept is multiple, the work highlights the benefits of reducing order execution time, then maintaining low inventory levels, as well as the benefits of reducing working capital requirements. As an example, we have analyzed the production process of a complex product that is part of the production program of a manufacturing company. Lean implementation requires that the company is always in transition and constantly improving. For this reason, it should never start as a short-term project with a clearly defined start and end date. Also, for the lean concept to be successfully implemented in industrial companies, there must be an equal desire and motivation of both management and all employees.

Key words: Lean concept, Delivery time reduction, Inventory levels, Current assets.

INTRODUCTION

The origins of the Lean concept are largely attributed to Toyota, whose production system was originally called just-in-time (JIT), but is commonly referred to today as Toyota's manufacturing system (TPS) (Fullerton et al., 2014). Womack et al. (1991) were the first to define the term "Lean Production" in their first book, The Machine That Changed the World. In industrial systems, the Lean concept is largely based on designing a work process that is applicable, flexible, consistent, and sustainable in space and time. The application of the Lean concept is caused by customer requirements and requires continuous improvement of work and production processes under the given circumstances. By implementing the Lean concept, organizations are transformed from a traditional structure, characterized as bottom-up with the improvement of projects led by middle managers, to one where continuous improvement throughout the company is carried out by locally empowered teams (Fullerton et al., 2014). This change in production strategy is associated with increased operational efficiency and effectiveness, which positively affects the performance of the company (Yang et al., 2011). No matter what product the company produces, it seems that every year more and more competitors enter the market. The market is becoming more and more unstable, so understanding the dynamics of the market is a crucial factor if we want to better design production systems (Gadalla, 2010). Each of the competitors offers some different attributes that set them apart from the competition. Buyers become quite hesitant when shopping and show much less loyalty to long-standing inherited business relationships. Lean Production believes in the simple fact that customers will pay for the quality of the products they buy, but will not pay for mistakes (Ravabdeh, 2005). These differences include shorter delivery times, higher quality, and lower prices. If the competition offers the same cutting-edge technology, quality, and price as your technology, then another criterion

must be developed to distinguish your product from the competition of the product. There must be some compelling reason to persuade customers to decide to buy your product before another competing product. For example, when the customer notices that there is no difference between the products, but expects fast delivery, the manufacturer with the ability to respond faster than the competition comes into a situation to close the deal with the customer.

Industrial production in many developing countries are working on old and outdated production techniques. Lean production differs from traditional production. Traditional production strategies are geared toward inventory systems, while Lean production opposes this concept. Understanding the differences between traditional manufacturing and Lean manufacturing is very important for all companies if they want to follow Lean practices. When Lean production is successfully implemented, it results in an increase in per capita production and a reduction in inventories of finished and semi-finished products, as well as a reduction in production processes. The concept of Lean production may seem easy, but its application is not an easy one. The introduction of the Lean concept in the organization tends to change the work culture. Such changes are considered obstacles in the process of applying the Lean concept. Changes that happen in the organization tend to change the workers in the organization as well. Many studies and research show that only 5% add value during operations, and the remaining 95% are losses. The lean concept is trying to remove that 95% of lost time and effort. Many authors emphasize the advantages of implementing the Lean concept in manufacturing companies. Lathin (2001) stated that traditional mass producers can expect a 90% reduction in inventories, 90% quality costs, 90% shelf life, and a 50% increase in labor productivity. Claudius Consulting (2004) insisted that the Lean concept can help organizations reduce costs by 15 to 70%, reduce waste by 40%, increase productivity by between 15 and 40%, and reduce space and inventories by 60%. Nistuen (2002) stated that product flow time can be reduced by 90%, inventories by 82%, and product delivery time by 11% by applying the Lean concept in the organization. Eroglu and Hofer (2011) in their research addressed the impact of inventories on organizational performance. They found that there are 33% of industries show a significant effect of the Lean concept on the impact of inventories on an organization's performance. In the continuation of the paper, some possibilities of the influence of the Lean concept on the possibility of faster product delivery are presented. A Lean concept allows the company to shorten the execution time of the order, to have higher quality and lower prices - differences that separate one supplier from another.

As an example, we analyzed the manufacturing process of a complex product, which is a part of the production program of the Company JSC "Sloboda" Cacak. The data used to analyze the impact of the Lean concept on the efficiency of order delivery to customers are the results of recording the production process of a complex product "Missile laborated". The product consists of 9 positions whose development requires the implementation of a series of different operations, of different duration, realized on different machines.

INFLUENCE OF LEAN CONCEPT ON REDUCTION OF DELIVERY TIME

One of the most common reasons for introducing the Lean concept is the desire of manufacturers to reduce long delivery times in their companies. In most cases, the order execution time usually exceeds the delivery time required by customers. Too long production time forces manufacturers to predict or forecast future customer demand and final configuration. Quantities of raw materials, semi-finished products and finished products are stored in preparation when ordering configured products. Strategies of the so-called buffer inventories, or inventories that are available to stabilize variations in demand, usually meet customer demand. But at the same time, they are an expensive solution. Manpower and production machines represent the resources engaged to produce products before receiving current orders from customers. Buyers expect orders to be delivered within the standard delivery time. If the delivery time is longer than the expected delivery time, there is customer dissatisfaction, which can have a negative impact on the potential order. Then alternative strategies can be used to meet customer demand in a timely manner.

For the aforementioned product, a detailed analysis of the technological process has been performed, as well as the analysis of used machines and their capacities, available workers, the number of shifts, based on which, for each position precisely a specified time for creating a series of 200000 pieces which is necessary to produce monthly to meet the planned delivery dates.

Table 1: Lean concept strategy to reduce customer-dictated delivery time compared to some of the traditional alternative strategies

Lean concept strategies	**What it means?**	**Traditional alternative strategies**	**What it means?**
– Supplier delivery times dictate the quantities of materials purchased	The amount of inventory that is kept as a raw material manages to establish a balance between the time of order execution and investment in inventory. Retaining components in the raw material storage, where the inventories with the lowest costs available to the manufacturer are located	– Inform the customer that he must accept the current duration of production	This solution is accepted as a solution only if the company has no competition, or if the company is the only supplier of products.
– Assess customer needs for highly configured products	Some customers will not accept the production time, plus the delivery time of the suppliers needed to obtain the specialized parts needed for their orders. An alternative Lean strategy for these customers is to assess their needs for highly configured products and then hold the components in hand as just a raw material in anticipation of receiving their orders.	– Provide inventories of semi-finished products, partially completed assemblies or subassemblies	Provide inventories, which can be fully assembled into the final configuration of the finished products, as soon as the order is received. Semi-finished items can be converted into finished products in less time than the usual delivery time dictated by the customer. Retaining inventories of semi-finished products, which are needed to quickly respond to customer demand, is an efficient but expensive solution.
– Purchase only the necessary materials	Refers to the necessary materials needed for the most common products. Components are not ordered from the supplier until the customer's order is received. A highly configured special type of product is never produced, as long as there is no real customer demand for that product.	– Deliver products from the warehouse of finished products.	Retaining finished products before receiving the order is a functional solution if the products are generic, ie if their patent protection period has expired. But it can also be a very expensive solution.

The question is, how accurate are the forecasts of future demand? Based on the answer to this question, it must be considered that the same forecasts of future customer demand and final configuration are used to start planning and scheduling systems, as well as to approve the cost of production resources and develop a production plan. Any orders issued in the warehouse of unsold products require the delivery of materials before orders are received. They also require the engagement of labor and machine resources. Expensive resources of the company are engaged in the production of products based on the optimistic assumption that we hope that customers will eventually buy the products. By forecasting, programs with predetermined quantities are transformed into large series with a large number of products that are directed through production. When current customer demand was received and the combination and quantity of products were not in line with the forecast, resources were used up and inventories were produced that remained unsold. These unsold inventories, which cannot be further diverted for use in the production of other

products, are the main cause of the increase in inventories. Often unsold inventories of semi-finished products are used to complete the production process of finished products, which are the most expensive category of inventories.

Lean factories can produce products only in the total amount of their working time and thus will achieve a significantly shorter order execution time, ie delivery time defined by the customer. The application of this Lean concept brings manufacturers a great advantage over competitors who continue to use traditional methods to direct their products through a functional factory. Shorter order execution times allow for a faster response to customer demand. It also enables a reduction in the amount of inventories of finished products and semi-finished products, ie buffer inventories, which are available in order to enable a faster response to customer demand. When the time of execution of the order through production is shorter than the current time of delivery, there is no need to keep unsold products in the warehouse of finished products. The ability to respond quickly to customer demand is a key advantage that the manufacturer achieves in the market compared to the competition. In the commodity market, the Lean concept ability to deliver products faster ultimately leads to an increase in market share, which allows customers to have the fastest order execution time as the most important criterion for making a purchase decision. When all other product attributes on the market are the same, this criterion represents a huge difference and brings a serious advantage to manufacturers over the competition.

Although shortening long delivery times is almost universally stated as the number one goal in Lean business transformation, the Lean concept has other benefits that may be attractive to manufacturers based on their specific manufacturing capabilities. Sometimes, in a hurry to answer a specific question such as reducing delivery time, very little attention is paid to other improvements that result from the transformation of the factory into a Lean concept. When these improvements stand out over time, they are a great pleasure and surprise for the manufacturer.

The results of the applied measures of utilization of the Lean concept enable the reduction of the duration of non-productive activities of the production process, such as ordering and receiving materials, transport, inventories management, etc.

IMPACT OF LEAN CONCEPT ON MAINTENANCE OF INVENTORY LEVELS

Over time, various inventory strategies have been developed to adjust the time gap between the delivery time dictated by the customer and the actual execution time of the order. The purchase of necessary inventories of components, based on the projected projection of the final configuration that customers are likely to order, is another inventory strategy used to respond quickly to customer demand. In any strategy, if customers fail to purchase partially built product units or anticipated configurations, the result is the excess, slow movement, or outdated inventory of parts. Regardless of the strategy chosen, it is always necessary to invest in inventories for the strategy to work. The costs of these models are so-called. buffer inventories can be huge. In addition to the material used for the amount of unsold inventories, machinery and labor resources are also consumed during production, even before customers have committed to buy them. If demand estimates are wrong, unsold inventories that ends up in the warehouse has used up resources that cannot be recovered.

The duration of the offer dictated by the buyer determines the inventories management policy. Delivery time dictated by the customer is the delivery time defined when the customer first sends the order to the manufacturer, and there are no available inventories of products that would immediately fulfill the customer's order. The time required by customers significantly affects the company's inventories policy. The number of days of keeping inventories of finished and semi-finished products is equal to the number of days dictated by the customer. The length of the period dictated by the customer determines the company's inventories management policy. Each day of duration dictated by the customer represents 1 day of keeping inventories of semi-finished products and 1 day of keeping inventories of finished products. If the delivery time dictated by the customer is unacceptable, inventories of finished products and semi-finished products allow fill the gap between the current delivery time and the current order execution time. Lean system implementation can reduce inventory levels, this is shown in Table 2.

Table 2: Benefits of Lean concept impact on maintenance of inventories levels

	Benefits
Lean concept	– Since the execution time of the order is shortened by the Lean system, the reasons that justify the retention of inventories of semi-finished products, as a mechanism for rapid response, are no longer valid.
	– The amount of possible reduction in inventories is directly proportional to the length of time the order is executed.
	– Order execution time is the minimum time required to move a product through production processes.
	– If the execution time of the order is less than the delivery time expected by the buyer, the question arises whether it is necessary to have the so-called buffer inventories of semi-finished or finished products?
	– In the Lean plant, production resources are not engaged in the production of the product until the customer commits to purchase it.
	– Lean manufacturers continue to reduce order execution time by constantly aiming to make production time shorter than the time dictated by the customer.

Based on the analysis of the presented benefits (Table 2), applying the Lean concept, some of how excess inventories can be reduced so that we can maintain inventory levels are shown.

IMPACT OF LEAN CONCEPT ON REDUCTION OF CURRENT ASSETS NEEDS

A major but often untapped source of savings is the reduction in working capital needed to run a business. By simply improving the response through production, working capital needs can be minimized. Less money invested in inventories and a shorter response time to customers would provide a huge competitive advantage. The amount of inventory present at the point of sale that is ready for distribution to interested consumers affects the requirements of working capital. Regardless of the strategy chosen to reduce delivery time, the manufacturer must determine the appropriate amount of inventory to be maintained to maximize customer satisfaction. Any amount of inventories retained through any stage of the production process has an impact on a company's working capital. Working capital can be calculated using the following relation (Hobbs 20011):

$$\text{Current assets} = \text{raw materials} + \text{intermediates} + \text{final products} + \text{receivables} \\ \text{amount of the obligations (material purchase)} \quad (1)$$

The money that is usually invested in purchased inventories can be analyzed on the example of a batch of 200,000 pieces of a complex product, which needs to be produced monthly to meet the planned delivery deadlines. This product is a part of the production program of the Company "Sloboda" Cacak.

- For the production of this series, the company must fulfill its obligations to suppliers within 60 days. If suppliers expect payment in 60 days, then the paid purchased material stays in the warehouse for 60 days before starting production work. Inventories older than 60 days represent cash investments.
- If the conversion of production lasts 8 weeks, then the funds are tied for another 8 weeks to support semi-finished products, while moving through production.
- If the inventory levels are ready in 6 to 8 weeks, then the cash is tied for an additional 6 to 8 weeks.
- Upon completion of production, the products can be delivered by customer orders. Customers may be charged at this time. Typical claims are from 50 to 60 days. If the customers do not pay the invoices immediately after the delivery of the product, then the funds are tied to the sale.

Based on the analysis of the previous example, the calculation of current assets can be performed using the formula (1): raw materials = 8 weeks; intermediates = 8 weeks; final products = 8 weeks; receivables = 8 weeks; obligations = 8 weeks; **current assets = 24 weeks**. In this typical example of investing in inventory, money is invested for at least 24 weeks, resulting in an inventory turnover rate of 2,167 (52 weeks of the whole year ÷ 24 weeks in inventory). Working capital of ¢25 is required for every €1 delivered in revenue to support this level of paid inventory.

A higher level of inventories requires relatively higher monetary investments. A high level of inventory affects not only current assets, but also requires space in warehouses and distribution centers. This space also requires costs. This increases the overhead costs of operations, ie costs that are not directly related to production. The financial consequences can be very significant. Compensation between achieving timely delivery goals to customers and maintaining ideal inventory levels is the subject of much debate. Although shortened order execution time is a direct benefit to customers, shortened order execution time through production also means less cash is needed to fund inventories. In this way, the funds available to the company can be used for other purposes. Reduced inventories also eliminate additional overheads and bookkeeping costs that can represent ± 12 to 20% of inventories value. The reduction in inventories resulting from Lean business transformation is not a one-time event.

CONCLUSION

The implementation of the Lean concept tries to increase the flow of value in customer demand and eliminate losses in processes. This paper presents the advantages of the implementation of the lean concept: reduction of delivery time, maintaining a low level of inventories, and reducing the need for current assets. This concept also has many hidden advantages that play a vital role in the success of the company, which are not seen at first. These advantages have a direct role in the success of the Lean concept, but they have also the following very important indirect roles that cannot be neglected: improving quality and safety; reduction of transport time; change in work culture; reduction of fatigue and stress. The results obtained from the Lean concept utility analysis, which are presented, can be of significant help to many managers who aim to transform traditional production into Lean production.

REFERENCES

Claudius Consulting. (2004). *Lean manufacturing*. York, UK: Claudius Consulting.

Demeter, K. & Matyusz, Z. (2011). The impact of lean practices on inventory turnover. *International Journal of Production Economics*, 133 (1), 154-163.

Eroglu, C., & Hofer, C. (2011). Lean, leaner, too lean? The inventory-performance link revisited. *Journal of Operational Management*, 29 (4), 356 – 369.

Fullerton, R. R., Kennedy, F. A., & Widener, S. K. (2014). Lean manufacturing and firm performance: The incremental contribution of lean management accounting practices, *Journal of Operations Management*, 32 (7-8), 414–428.

Gadalla, M. A. (2010). A conceptual framework to excogitate agile from lean transformation. *International Journal of Rapid Manufacturing*, 1 (3), 308 – 322.

Hobbs, D. P. (2004). *Lean Manufacturing Implementation: A CompleteExecution Manual for Any Size Manufacturer*, J. Ross Publishing, Inc.

Hobbs, D. P. (2011). *Applied Lean Business Transformation: A Complete Project Management Approach*, J. Ross Publishing, Inc.

Lathin, D. & Ron M. (2001). Lean manufacturing: Techniques, people and culture. *American Society for Quality Journal*, 12, 2–9.

Nystuen, T. (2002). *Big results with less - NIST program helps small organizations eliminate waste, Quality Progress*, 35 (10), 51 – 55.

Prajapati, M. R. & Deshpande, V. A. (2015). Cycle Time Reduction using Lean Principles and Techniques: A Review. *International Journal of Advance Industrial Engineering*, 3 (4), 208-213.

Rawabdeh, I. A. (2005). A model for the assessment of waste in job shop environments. *International Journal of Operations & Production Management*, 25 (8), 800 – 822.

Shah, D. & Patel, P. (2018). Productivity Improvement by Implementing Lean Manufacturing Tools In Manufacturing Industry. International Research Journal of Engineering and Technology, 5(3), 3794-3798.

Womack, J. P., Jones D. T., & Roos, D. (1991). *The Machine That Changed the World: The Story of Lean Production*, Harper Collins Publishers, New York.

Yang, M. G., Hong, P., & Modi S. B. (2011). Impact of lean manufacturing and environmental management on business performance, *International Journal of Production Economics*, 129 (2), 251-261.

RISK MANAGEMENT AND EXCAVATOR DOWNTIME ANALYSIS

Vesna Spasojević Brkić
University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia
E-mail: vspasojevic@mas.bg.ac.rs
Mirjana Misita
University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia
Aleksandar Brkić
Innovation center, Faculty of Mechanical Engineering, Belgrade, Serbia
Zorica Veljković
University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia
Martina Perišić
University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia
Neda Papić
University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia
Nemanja Janev
University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia

ABSTRACT

Nowadays, safety and sustainable business success cannot be viewed in isolation. Risk assessment is a prerequisite for adequate planning of prevention of destruction of critical potentials, as well as preparation of a strategy for response to failure in the context of prevention of consequences. An important part of all construction equipment maintenance is proper record keeping, but it is not done often in practice although it is a prerequisite of proper risk management. Proper maintenance of excavators maximizes fuel efficiency and reduces operating costs as well as equipment failure. The aim of this paper is to present the missing facts, to propose the methodology to be applied and show and analyze results obtained on excavator down time analysis and risk management. This research analyzed the structure of downtime and consequences in excavator work in six large Serbian companies during a period of one year. Delays in the observed transport and mining machines were classified according to the type of downtime: technological downtime, power / electricity downtime, mechanical downtime, misuse due to abuse, organizational downtime and downtime due to external influences. In this research, the frequencies of downtime were monitored by the stated categories of downtime. The consequences of the identified delays were then assessed, and the risk calculated.

Key words: Excavator, Downtime, Probability, Consequence, Risk management.

INTRODUCTION

Nowadays, safety and sustainable business success cannot be viewed in isolation (Spasojevic Brkic et al., 2015). Accidents in the field of transport and mining equipment are still numerous (Brkic et al., 2020). Motivation for research on risk prevention of transport and mining machines is based on the following facts: a) only 12.87% of risk research focuses on transport problems, b) the greatest potential for reducing incidents is in reducing the number of human errors, i.e. identification of human and organizational factors in risk assessment, c) although ISO 31000 promotes a contextual framework, the assessment of the impact of contextual factors is not available in many areas, including this, d) risk assessment methods are usually not based on scientific methods (only 6.56%), and e) hybrid risk assessment methods are rarely represented in both research and practice (6.70%) (ISO 31000: 2018; Marhavilas et al., 2011; Shahin et al., 2018). However, risk analysis is, as a rule, always very complex, due to the following factors:

- uncertainty related to defining the problem,
- difficulties that arise during the evaluation of facts,

- complexity of discovering relevant values,
- unpredictability of the behavior of participants in the process, and
- ambiguity of process evaluation.

On the other hand, risk assessment is a prerequisite for adequate planning of prevention of destruction of critical potentials, as well as preparation of a strategy for response to failure in the context of prevention/remediation of consequences. The lack of precise definition of as well as the criteria of indicators in risk analysis and assessment, imposes the need for novel methodology for risk assessment. A typical causal chain of a risk event contains the following events (Yang et al., 2020):

- Failure of certain elements of the system (internal disturbances) and/or unauthorized external disturbances;
- Occurrence of hazard factors in an unexpected place and/or at an unexpected time;
- Malfunction or lack of protective equipment and/or inappropriate behavior (new dismissals);
- Elements of the system in the new operating conditions and
- The effect of hazard factors on system elements and/or environments.

Analysis of the causal chain of risk events based on the characteristic states of the system indicates that the state of failure is preceded by the state of system risk. Therefore, studying the state of risk is important for maintenance. On the one hand, it improves the quality of maintenance according to the condition, and on the other hand, it provides the necessary information for planning and undertaking specific preventive maintenance activities. Also, improvements are expected in terms of (Edwards and Love, 2016):

- Fault prevention.
- Elimination of weaknesses in the means of work.
- Innovation in maintenance.
- Extension of the working life of working capital.
- Reduce repair time.
- Reducing the cost of materials, space, labor, tools and equipment, spare parts.

Excavators as heavy construction equipment with a bucket on the end of a jointed boom and a rotating cab are designed for digging earth, loading material onto trucks and digging trenches, and they are subjected to harsh climate, often operating in different weather conditions. Proper maintenance of excavators maximizes fuel efficiency and reduces operating costs, as well as, equipment failure (Papic et al., 2010). Every minute an excavator or other heavy equipment is offline due to a breakdown, costs the operator money in wages and lost productivity (Rudakov et al., 2021). Scheduled maintenance can help contain these expenses and maximize productivity (Kirin et al., 2021). An important part of all construction equipment maintenance is proper record keeping, but it is not often done in practice, although it is a prerequisite of proper risk management. The aim of this paper is to present the missing facts, to propose the methodology to be applied and show and analyze obtained results.

PREVIOUS RESEARCH

As mentioned above, researh in this field are rare. One of the few is presented by Kumar and Srivastava (2014), who developed an expert system for optimal excavator maintenance. The methodology is based on the use of a database generated by the manufacturer, and specific user data is entered into the system. Methodology of maintenance of excavators and failures on its components on the basis of database, by applying FMEA, FMECA and condition based on maintenance - CBM (condition based maintenance maintenance) methods for failure prediction is very useful (Pantelic et al., 2020). Pareto method usage is also recommended (Brkic et al., 2020). The aim of the research was to use the optimal maintenance methodology in order to reduce maintenance and production costs.

The first step in designing an expert system was to generate a database based on monitoring and control. The data were recorded permanently and periodically, The selected data were saved in the

maintenance database. Three categories of data were recorded in the database. The first category refers to all system data measured during 20 recording sessions. The second category refers to each recording session separately, in order to the detected changes on certain components in terms of deterioration in the condition in which the observed components are located. The third category of data represents all system data, measured during all sessions in which failure was detected.

The second step relates to the application of FMECA analysis, taking into account 6 parameters: safety, importance, maintenance costs, failure frequency, failure time and operational status. The second step in designing an expert system is FMEA analysis. Kumar and Strivastava (2014) considered five different types of excavator (hydraulic) mine exavator. The primary research included the identification of various components (assemblies, subassemblies), and the corresponding types of failures for excavators: electric motor, suspension system, hydraulic system, etc. During the extensive research, relevant maintenance data were collected for all types of failures represented. This data/information was recorded for RCM maintenance in FMEA tables, and parameters such as failure severity, frequency of occurrence, detection capability, total risk for each failure applied to five different types of excavators were observed.

In the third step of the research is design a condition-based maintenance architecture - CBM (Condition Based Maintenance). CBM is applied as input information to make maintenance dynamic. CBM is conducted to determine if there is a problem with the excavator that is the subject of the survey, how serious the observed failure is, so that maintenance tasks are planned in a timely manner. Maintenance models for bucket wheel excavators are much more common (Lazarevic et al., 2018; Papic et al., 2014; Danicic et al., 2009; Brkic et al., 2014).

METHODOLOGY

This research analyzed the structure of downtime and its consequences in different excavators working in six large Serbian companies during a period of one year. Delays in the observed transport and mining machines were classified according to the type of downtime: technological downtime, power/electricity downtime, mechanical downtime, misuse due to abuse, organizational downtime and downtime due to external influences. In this research, the frequencies of downtime were monitored by the stated categories of downtime. The consequences of the identified delays were then assessed, and the aim of the research was to calculate the risk as a product of the probability of the event and the consequences that the adverse event could cause.

RESULTS

Descriptive statistics of collected data are given in Table 1.

Table 1: Deskriptive statistics

	N	**Me**	**Med**	**Min**	**Max**	**R**	**SD**	**c_v(%)**
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-M	112	84.866	30.0	5	1200	1195	149.443	176.09
EX-Z	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-E	1	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.	n.e.
EX-SO	169	1.716	1	1	5	4	1.221	71.14
EX-V	169	75.917	30	5	1200	1195	136.232	179.45

The scatter diagram between the hazard level and the failure frequency is shown in Figure 1, while the histograms for the hazard level and the frequency of downtime/failure are shown in Figures 2 and 3, respectively. Figure 4 shows a histogram of the hazard level and downtime/failure of the excavator.

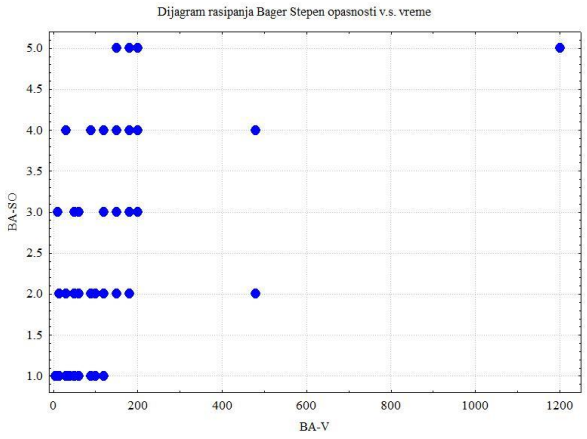


Figure 1: Scatter chart between the hazard level and the time of failure/downtime for excavators

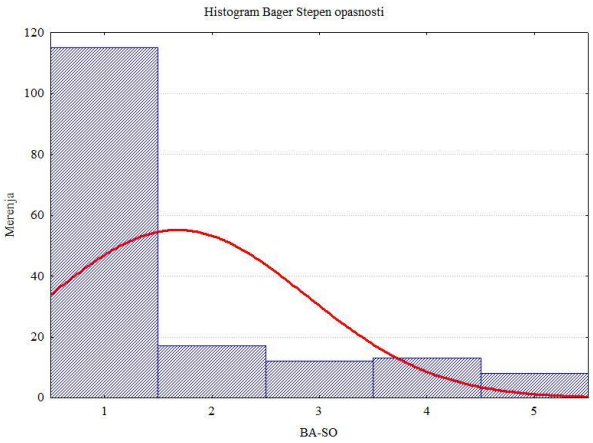


Figure 2: Histogram for the hazard level for excavators

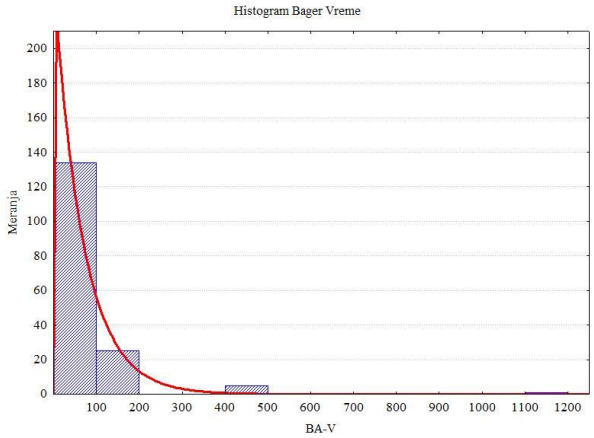


Figure 3: Histogram of standstill/ failure time for excavators

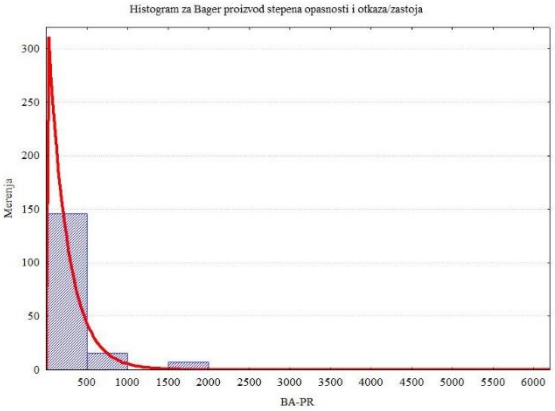


Figure 4: Histogram of product of failure rate and standstill/failure time for excavators

Figure 5 shows the structure of stagnation by categories in excavator machines. A total of 170 outages in excavator machines were identified, with 112 outages classified as mechanical, 54 technological and 3 as electrical outages. Mechanical causes have the largest share in the structure of congestion, 66%, followed by technological congestion with 32%. Other categories of congestion have a smaller percentage.

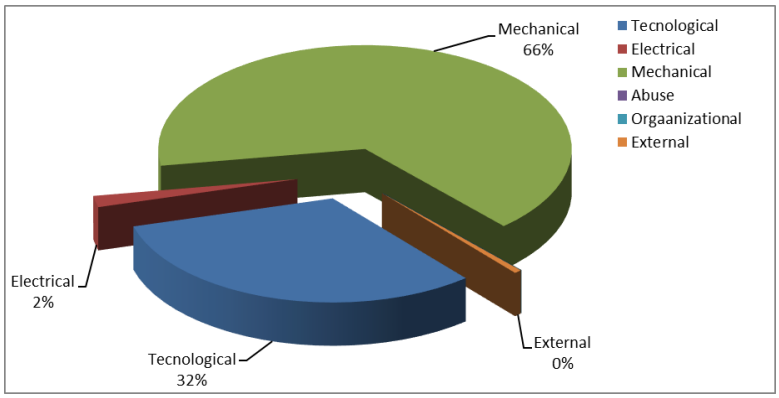


Figure 5: Measured structure of stagnation by categories in excavator machines

All delays in the observed mining and transport machines were assessed by experts according to the hazard level, on a numerical scale of 1-10, where the highest score of 10 represents the highest hazard level. During the assessment of the hazard level, the experts were guided by the assessment of the

danger of stagnation in relation to human safety and health, danger to the environment, danger of damage to the posthumous type of transporting or mining machine, danger of financial loss.

Figure 6 shows the percentage of delays classified by hazard level in the excavators. The largest share in the structure of the level of danger has the delays of the level of danger 6, i.e. 78%, followed by the delays of the level of danger 7 and the delays of the level of danger 8 with the same percentage of 9%.

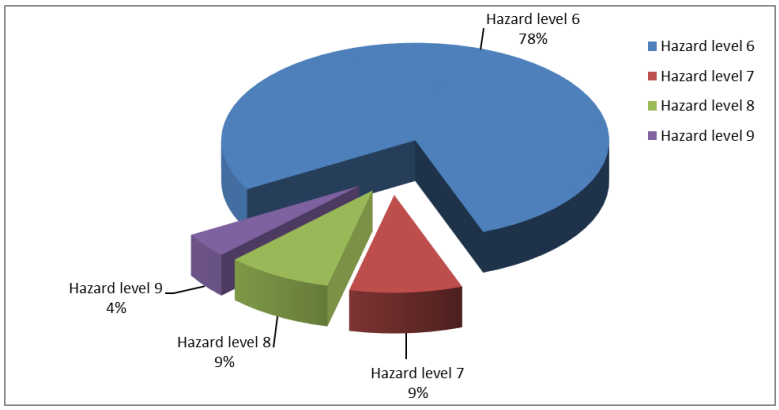


Figure 6: Structure of hazard levels in excavators

In Table 2 the percentage of downtime frequencies for excavators is presented, by categories of downtime and by hazard level. The presented percentage structure of downtime frequencies in excavator machines has already been analyzed and shown in Figures 6, 7, 8 and 9.

Table 2: Percentage of downtime frequencies for excavators, by downtime categories and by hazard level

Hazard level	**Technological**	**Electrical**	**Mechanical**	**Misuse**	**Organizational**	**External**	**Σ**
Hazard level 6	0.28	0.01	0.49	0.00	0.00	0.00	**0.78**
Hazard level 7	0.02	0.01	0.06	0.00	0.00	0.01	**0.09**
Hazard level 8	0.02	0.01	0.06	0.00	0.00	0.00	**0.09**
Hazard level 9	0.00	0.00	0.04	0.00	0.00	0.00	**0.04**
TOTAL	**0.32**	**0.02**	**0.66**	**0.00**	**0.00**	**0.01**	**1.00**

Let the percentage share of frequencies of a certain delay be taken as the probability of occurrence of the observed delay in the following period. The following notations have been introduced:

P_i - probability of occurrence of certain malfunctions,

P_t - probability of occurrence of technological malfunctions,

P_e - probability of occurrence of electrical malfunctions,

P_m - probability of occurrence of mechanical malfunctions,

P_z - probability of occurrence of malfunction due misuse,

P_o - probability of occurrence of malfunction due organizational problems,

P_{ei} – probability of occurrence of malfunction due external influences.

Risk is calculated as the product of the probability of an adverse event and its consequences. Therefore, hazard level represents potential harm due to the occurrence of an adverse event by:

$$R_i = P_i \cdot C_o \tag{1}$$

where:

R_i - Risk

C_o - Hazard level

Table 3 presents the risk calculation for all categories of downtime by hazard level.

Table 3: Excavator risk calculation, by downtime categories and by hazard level

Hazard level	Technological	Electrical	Mechanical	Misuse	Organizational	External	Σ
Hazard level 6	16.59	0.35	29.65	0.00	0.00	0.00	**46.59**
Hazard level 7	1.65	0.41	4.12	0.00	0.00	0.41	**6.59**
Hazard level 8	1.41	0.47	5.18	0.00	0.00	0.00	**7.06**
Hazard level 9	0.00	0.00	3.71	0.00	0.00	0.00	**3.71**
TOTAL	**19.65**	**1.24**	**42.65**	**0.00**	**0.00**	**0.41**	**63.94**

$$R_{EXt} = P_{t6} \cdot C_{o6} + P_{t7} \cdot C_{o7} + P_{t8} \cdot C_{o8} + P_{t9} \cdot C_{o9} = 0.28 \cdot 60 + 0.02 \cdot 70 + 0.02 \cdot 80 + 0 \cdot 90$$

$$R_{EXt} = 0.28 \cdot 60 + 0.02 \cdot 70 + 0.02 \cdot 80 + 0 \cdot 90 = 16.95 + 1.65 + 1.41 = 19.65$$

$$R_{EXe} = P_{e6} \cdot C_{o6} + P_{e7} \cdot C_{o7} + P_{e8} \cdot C_{o8} + P_{e9} \cdot C_{o9} = 0.01 \cdot 60 + 0.01 \cdot 70 + 0.01 \cdot 80 + 0 \cdot 90 = 1.24$$

$$R_{EXem} = P_{m6} \cdot C_{o6} + P_{m7} \cdot C_{o7} + P_{m8} \cdot C_{o8} + P_{m9} \cdot C_{o9} = 0.49 \cdot 60 + 0.06 \cdot 70 + 0.06 \cdot 80 + 0.04 \cdot 90 = 42.65$$

$$R_{EXz} = P_{z6} \cdot C_{o6} + P_{z7} \cdot C_{o7} + P_{z8} \cdot C_{o8} + P_{z9} \cdot C_{o9} = 0 \cdot 60 + 0 \cdot 70 + 0 \cdot 80 + 0 \cdot 90 = 0$$

$$R_{EXo} = P_{o6} \cdot C_{o6} + P_{o7} \cdot C_{o7} + P_{o8} \cdot C_{o8} + P_{o9} \cdot C_{o9} = 0 \cdot 60 + 0 \cdot 70 + 0 \cdot 80 + 0 \cdot 90 = 0$$

$$R_{EXei} = P_{ei6} \cdot C_{o6} + P_{ei7} \cdot C_{o7} + P_{ri8} \cdot C_{o8} + P_{ei9} \cdot C_{o9} = 0 \cdot 60 + 0.01 \cdot 70 + 0 \cdot 80 + 0 \cdot 90 = 0.41$$

$$R_{EX} = R_{EXt} + R_{EXe} + R_{EXem} + R_{EXz} + R_{EXo} + R_{EXei}$$

$$R_{EX} = 19.65 + 1.24 + 42.65 + 0 + 0 + 0.41 = 63.94$$

Figure 7 shows the risk structure by levels of danger and types of downtime for excavators. The greatest risk with hazards of danger level 6, have mechanical delays with a risk 29.65, followed by technological delays with a risk 16.59.

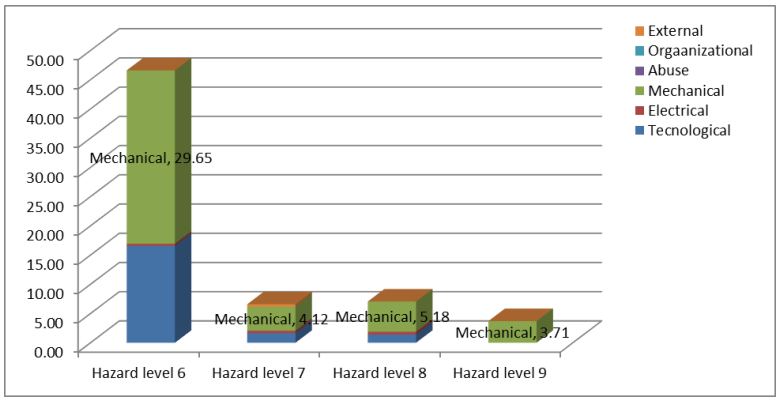


Figure 7: Risk structure by degrees of danger and types of stagnation in excavators

Conversely, by categories of in the structure of mechanical delays (Figure 8), the greatest risk is caused by delays for danger level 6 with a risk value of 29.65. In the case of technological downtime, the highest risk is also at the hazard level 6, with a risk 16.59.

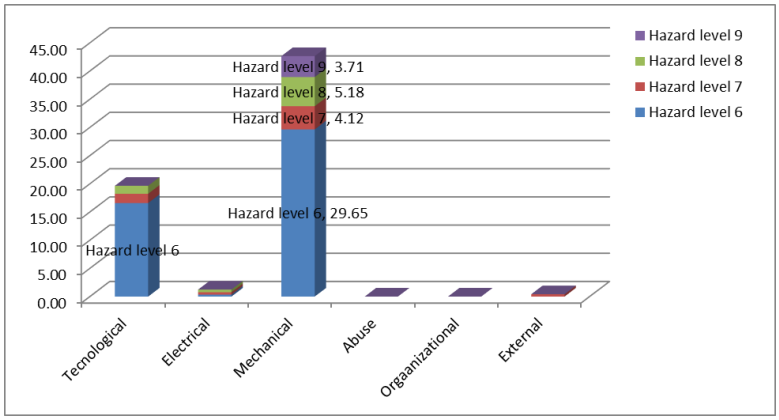


Figure 8: Risk structure by degrees of danger and types of downtime in excavators

Finaly, risk matrix is shown at Figure 9.

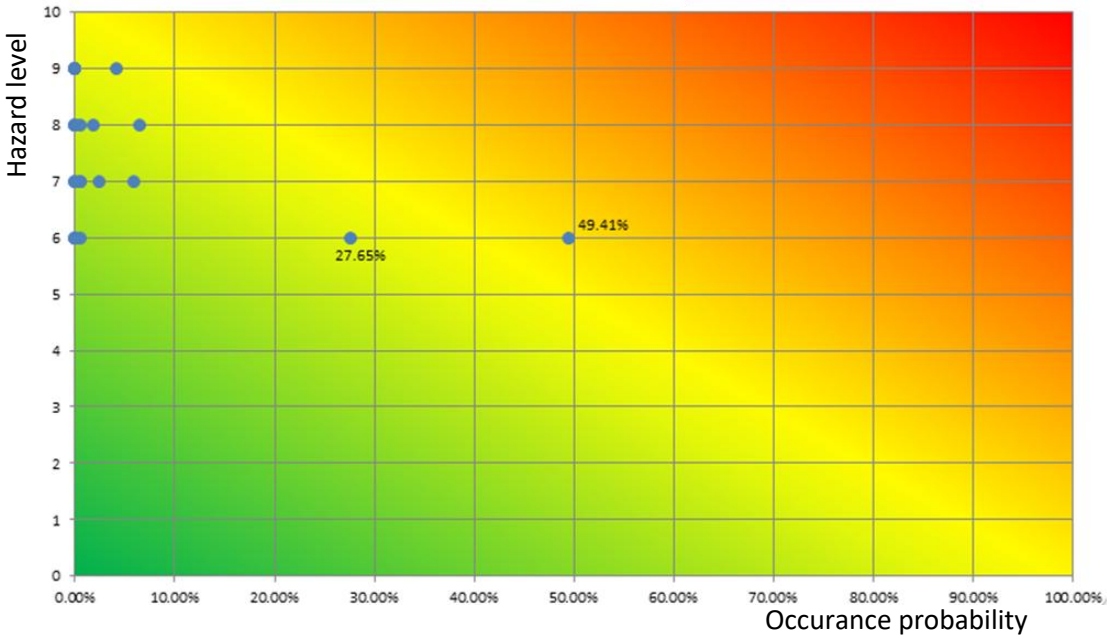


Figure 9: Risk matrix for excavators

CONCLUSION

Risk assessment is a prerequisite for adequate planning of prevention of destruction of critical potentials, as well as preparation of a strategy for response to failure in the context of prevention of consequences. An important part of all construction equipment maintenance is proper record keeping, but it is not done often in practice although it is a prerequisite of proper risk management. Proper maintenance of excavators maximizes fuel efficiency and reduces operating costs as well as equipment failure. The aim of this paper is to present the missing facts, to propose the methodology to be applied and show and analyze results obtained on excavator down time analysis and risk management. This research analyzed the structure of downtime and consequences in excavator work in six large Serbian companies during a period of one year. Delays in the observed transport and mining machines were classified according to the type of downtime: technological downtime, power/electricity downtime, mechanical downtime, misuse due to abuse, organizational downtime and downtime due to external influences. In this research, the frequencies of downtime were monitored by the stated categories of downtime. The consequences of the identified delays were then assessed, and the risk calculated. Results show that mechanical causes have the largest share in the structure of congestion - 66%, followed by technological congestion with 32%, while other categories of congestion have a small percentage. Anyhow, it is evident that there are no extreme risks (red zone). Total risk amounts 63,94. Limitation of this research for sure is the data collected sample size, so its extension is recommended. Further recommendation for future research is also a more detailed analysis on collected data done by using more sophisticated statistical analysis tools based on larger sample size.

NOMENCLATURE

EX-T	Excavator - technological failure/downtime	Med	median
EX-S	Excavator - electrical failure/downtime	Min	minimum
EX-M	Excavator - mechanical failure/standstill	Max	maximum
EX-Z	Excavator - abuse	R	range
EX-O	Excavator - organizational failure/downtime	SD	standard deviation
EX-E	Excavator - external cause of failure/downtime	c_v(%)	coefficient of variation
EX-SO	Excavator - hazard level	P_o	probability of occurrence
N	number of measurements	R_i	risk
n.e.	not examined (insufficient data 0-3)	C_o	hazard level
Me	Mean value	Med	median

ACKNOWLEDGEMENT

The paper is supported by grants from the Ministry of Education, Science and Technological Development, grants from project E!13300 and RESMOD and contract 451-03-68/2022-14/200105 (subproject TR 35017).

REFERENCES

Brkić, A. D., Maneski, T., Ignjatović, D., Jovančić, P. D., & Brkić, V. S. (2014). Diagnostics of bucket wheel excavator discharge boom dynamic performance and its reconstruction. *Eksploatacja i Niezawodność, 16*(2), 188-197.

Brkić, A. Đ., Misita, M. Ž., Spasojević-Brkić, V. K., & Perišić, M. B. (2020). Pareto analysis application in research of crane related accidents. *Tehnika, 75*(2), 238-244.

Daničić, D., Jovančić, P., Ignjatović, D., & Maneski, T. (2009). Improvement of bucket wheel excavator maintenance by on-line and off-line method of condition and behavior diagnostics. *Tehnika-Rudarstvo, geologija i metalurgija, 60*(3), 9-14.

Edwards, D. J., & Love, P. E. (2016). A case study of machinery maintenance protocols and procedures within the UK utilities sector. *Accident Analysis & Prevention, 93*, 319-329.

ISO 31000:2018. Risk Management-Guidelines; ISO/IEC: Geneva, Switzerland, 2018.

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., & Srivastava, R. K. (2014). Development of a condition based maintenance architecture for optimal maintainability of mine excavators. *IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE), 11*(3), 18-22.

Lazarević, Ž., Aranđelović, I., & Kirin, S. (2018). The reliability of bucket wheel excavator-review of random mechanical failures. *Tehnički vjesnik, 25*(4), 1259-1264.

Marhavilas, P. K., Koulouriotis, D. E., & Mitrakas, C. (2011). On the development of a new hybrid risk assessment process using occupational accidents' data: Application on the Greek Public Electric Power Provider. *Journal of Loss Prevention in the Process Industries, 24*(5), 671-687.

Pantelić, M. P., Bošnjak, S. M., Misita, M. Z., Gnjatović, N. B., & Stefanović, A. Z. (2020). Service FMECA of a bucket wheel excavator. *Engineering Failure Analysis, 108*, 104289.

Papic, L., & Pantelic, M. (2014). Maintenance-oriented safety control charts. *International Journal of System Assurance Engineering and Management, 5*(2), 149-154.

Papic, L., Pantelic, M., Aronov, J., & Verma, A. K. (2010). Statistical safety analysis of maintenance management process of excavator units. *International Journal of Automation and Computing, 7*(2), 146-152.

Rudakov, M., Gridina, E., & Kretschmann, J. (2021). Risk-based thinking as a basis for efficient occupational safety management in the mining industry. *Sustainability, 13*(2), 470.

Shahin, A., Labib, A., Emami, S., & Karbasian, M. (2018). Improving Decision-Making Grid based on interdependence among failures with a case study in the steel industry. *The TQM Journal. 31*(2), 167-182.

Spasojević-Brkić, V. K., Milazzo, M. F., Brkić, A., & Maneski, T. (2015). Emerging risks in smart process industry cranes survey: SAF€ RA research project SPRINCE. *Serbian Journal of Management, 10*(2), 247-254.

Yang, Z., Baraldi, P., & Zio, E. (2020). A novel method for maintenance record clustering and its application to a case study of maintenance optimization. *Reliability Engineering & System Safety, 203*, 107103.

INDUSTRY 4.0: AN INNOVATIVE SOLUTION FOR MONITORING THE PRODUCTION PROCESS AND QUALITY CONTROL IN A TEXTILE FACTORY

Marija Stanojeska
Part-time professor, School of Business Economics and Management, UACS, Skopje, RNM
E- mail: marija.stanojeska@uacs.edu.mk

ABSTRACT

Industry 4.0 has the primary goal of improving organizational performance by enabling economic growth and high competition in supply chains. Consequently, Industry 4.0 technologies can affect the entire business system by using new tools to upgrade production systems to smart levels, generating flexible operations for quality control, production and delivery. Although there is implicit relevance to the use of Industry 4.0 technologies in the textile industry, the implementation of information and communications technology (ICT) tools to design more reliable and improved processes is still an unexplored area. The purpose of this study is to present the benefits of using software-oriented tools in the textile industry, as one of the most vulnerable types of industries due to labor-intensive use, lack of technology, and increased costs in terms of a high percentage of non-conformities. Namely, the research was conducted in a textile factory in which an intelligent platform was installed for collecting, measuring, and analyzing data for quality control and overall monitoring of the process. The findings indicate that the implementation of innovative techniques in Industry 4.0 allows for reducing the number of non-conformities and improving the quality of the production process.

Key words: Industry 4.0 technologies, Quality control, Production process and Non-conformities.

INTRODUCTION

In today's smart manufacturing environment, the textile industry faces challenges such as efficiency, sustainability, and quick response to clients' dynamic requirements as well as product quality and regulatory compliance which ascertain its survival (Balogun et al., 2019; Fatorachian, 2018).

Production has been influenced due to a lack of technological advancement, leading to an negative effect on overall performance including problems in terms of quality. Namely, textile manufacturing as a labor-intensive industry is based on human skills and capabilities to a great extent. Thus, the traditional approach to quality control means inspections by supervisors, selection of non-conformities, and rework. In addition, the traditional approach results in bottlenecks, delays and increased operational costs (Conci and Proença, 2002). The nature and complexities of garment production make it difficult to implement a labor-saving technology (Lekamge and Ekanayake, 2021). To cope with dynamic business environment, traditional textile industries are prone to integrating advanced technologies for /production, management, and operational processes (Longo et al., 2017). In this context it is worth to mention the large textile and apparel companies, such as Zara, Adidas, Marks & Spencer, Max fashion, Red Tag, and H&M which makes it possible to track and monitor different stages of production processes, and gain numerous benefits such as decreased operational costs, improved quality of the products and on-time delivery of the goods (Khorram et al., 2019). Consequently, automatic quality control has grown into one of the major challenges for achieving overall success in a highly competitive environment.

Nowadays, most companies are moving towards higher technology by introducing Industry 4.0 ideas (Judit et al. 2018; Tortorella et al., 2020). Most researchers and professionals agree that Industry 4.0 offers opportunities and promotes changes in markets, business models, supply chains, and the world

of work (Wang et al., 2016; Fogaca et al., 2022; Schneider, 2018). In that direction, understanding how these technologies are linked to quality improvement in the textile industry is an issue that is worth to be addressed, and that is relevant since globalization has made business values constantly change (Imran et al., 2018; Denvura et al., 2019). It is important to note that some textile industries are using advanced tools, especially under the Industry 4.0 concept (Rajnoha and Lesníková 2016; Shahriar, et al., 2016; Carvalho et al., 2015; Istrat et al., 2017). However, Industry 4.0 requires textile factories to create decision-making processes that improve the quality of the products impact the customer focus (Grzybowska and Łupicka, 2017; Trieu, 2017; Lee et al., 2018), and attain greater competitiveness in the market (Wang et al., 2016; Meyer, 2019; Fromhold-Eisebith et al., 2021).

However, the main prerequisite for the implementation of Industry 4.0 technology in the existing textile factories is to implement digital technologies in the direction to establish a solid ground for further improvements in the spirit of Industry 4.0 perspectives. Besides that, Industry 4.0 promotes production which automatically increases the overall performance and has the ability to resolve various issues through modern technologies. From that point of view, it is expected that this new paradigm, which employs digital tools will significantly improve quality, productivity, process efficiency, and competitiveness (Howaldt et al., 2017; Stentoft and Rajkumar, 2020). Furthermore, Industry 4.0 is a new era of the industrial revolution in which textile industry companies are adopting and integrating advanced technologies to achieve sustainability and a competitive edge (Ahmed et al. 2020; Demeter et al., 2020; Ghobakhloo et al., 2021; Dalenogare et al., 2018).

In that direction, organizations face new challenges because, although Industry 4.0 creates many opportunities for companies, at the same time, it generates challenges derived from automation and digitization (Aguilar-Rodriguez et al., 2021; Grzybowska & Łupicka, 2017; Wollschlaeger et al., 2017; Fogaca et al., 2022; Singh et al., 2019; Iqbal et al., 2018; Haseeb et al., 2019).

Therefore, the objective of this study is to research the benefits of using digital tools for data collecting and a processing, and on-time intervention in the direction of reducing the costs related to poor quality, in one textile factory in an emerging economy. The created database is a useful digital platform in the manager's hands to make the right decision in terms of enhancing the overall organization's performance.

RESEARCH DESIGN

The production process in the researched textile factory includes cutting, sewing (assembling), buttoning, ironing, packing, and shipment (Fig. 1.). The factory, which is in the topic of research, is equipped with two production lines. The first one is a standard/regular line where the control of the quality is performed on-site, just before the packing phase, by a few supervisors, as shown in Fig 1.

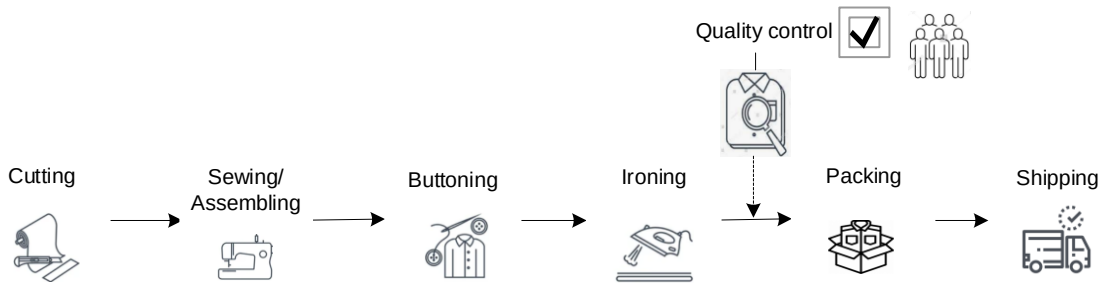


Figure. 1: Regular production line in the textile factory

This approach to quality control generates a high percent of non-conformities, detected just before packing. In such conditions, the delays occur because of the spending time reworking and failures correcting. Nevertheless, the delays in the textile industry are one of the major barriers to attaining competitiveness in the market. Namely, delays in the production process affect delays in goods

shipment, which is encompassed by low buyer satisfaction. Thus, inefficient quality control in the process leads to a high number of non-conformities and needs to rework the failed products before the execution of delivery. In that direction, the internal failure costs and in that point of view, the overall operational costs increases, primarily because of the need for engagement of an additional workforce for controlling, inspecting, reworking, and fixing failures.

The digital platform for tracking and monitoring the manufacturing process is implemented on the other production line – "the pilot line" (Fig. 2.). In essence, the digital platform for full tracking and monitoring of the manufacturing process includes collection and procession data using an appropriate fit-to-use software system. Each machine performs a certain operation. Using a controller, the particular operation mechanically performed on the respected machine is loaded as an input in the controller. Thus, the data is saved in the monitor as long as the operation is performed by the operator. The operation mechanically performed on the respected machine is fully synchronized with the data loaded in the controller. Using a software program structured for this purpose, the collected data from each monitor, are accurately processed, and valuable information in terms of executed tasks, interruptions, bottlenecks, delays, and non-conformities, in real-time is gathered.

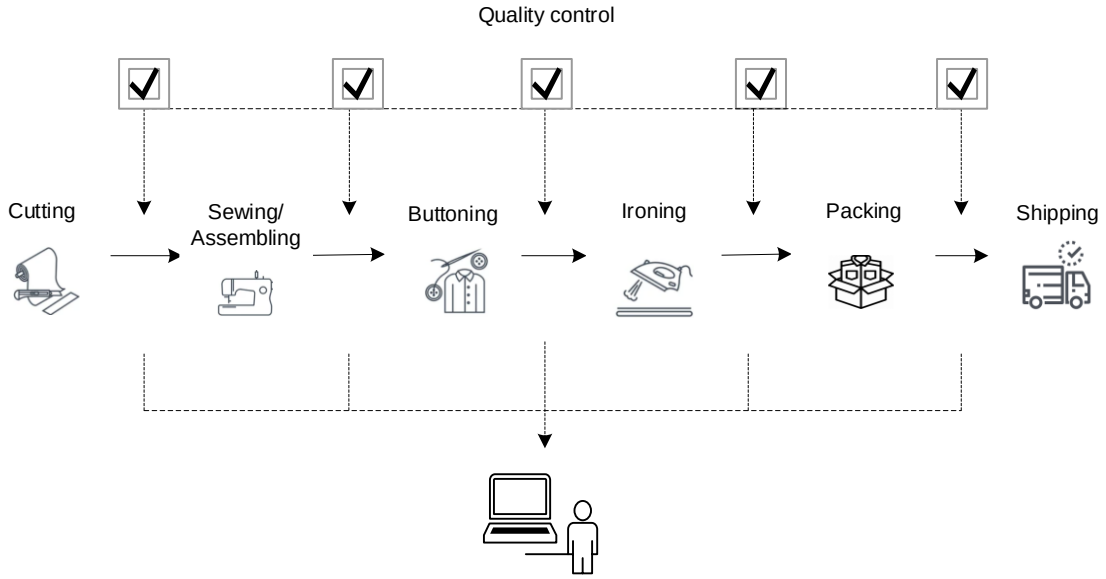


Figure. 2: Pilot production line equipped with digital devices in the textile factory

Opposite to regular line, the quality control on the digitalized (pilot) line is performed in each stage of the manufacturing, which means on time. In fact, every operator enters data related to non-conformities, and of course, related to the executed tasks in controllers. Only one supervisor is sufficient to monitor the entire process by the main computer unit. Regarding the processed information, on-time actions are undertaken in the manufacturing process.
In that sense, the goal of this research is:

G: To determine the efficiency of the implementation of the innovative digital platform for process monitoring and quality control in the textile factory, according to three criteria, internal failure costs, number of non-conformities and rework time.

Methodology

For the purpose of this research, the methodology of collecting, analyzing, and comparing data was implemented. The first set of data includes the data collected for the digitalized production line. Those data were stored in the software system, for the period of twelve weeks. The second set of data includes the data obtained through the same period (twelve weeks), which refers to the regular

production line. Those data were recorded by the five supervisor's evidence. After collecting the needed data, the next step of implemented methodology, which means data structuring and analysis, was performed. In general, there were more criteria for data collecting and process monitoring, such as the total number of produced items on each machine, calculation of the operator norm, percent of utilization of the single machine, total time of active operating on single machines, etc. However, for the aim of this research, an analysis according to the three criteria (i) rework time, (ii) number of non-conformities, and (iii) internal failure costs, was conducted. In the third step of the research methodology, the comparison of the databases was present and conclusions were given.

RESULTS AND DISCUSSION

According to the implemented research methodology, the finding data are present in Table 1.

Table 1: Collected data on a pilot line equipped with digital devices and regular line

Week No.	Pilot line equipped with digital devices			Regular line		
	Number of non-conformity units	Rework time (h)	Internal failure costs (€)	Number of non-conformity units	Rework time (h)	Internal failure costs (€)
Week 1	85	8.3	166	138	14.4	288
Week 2	74	7.7	154	124	13.8	276
Week 3	72	7.5	150	120	13.0	260
Week 4	75	8.0	160	125	13.3	266
Week 5	72	7.5	150	140	15.0	300
Week 6	70	7.3	146	135	14.2	284
Week 7	70	7.3	146	129	13.0	260
Week 8	65	7.0	140	133	13.8	276
Week 9	71	7.0	140	138	14.4	288
Week 10	68	7.0	140	134	13.8	276
Week 11	67	7.1	142	124	13.0	260
Week 12	71	7.3	146	124	13.0	260
Total	860	89	1780	1564	164.7	3294

It is obvious that the number of defects identified on the line equipped with digital devices is lower compared to the number of defects obtained from the regular production line. The explanation is the delayed action and delayed taking corrective measures. Namely, the implemented digital platform provides real-time information about the stability of the process. When operators entering data related to the poor quality in the controllers, the supervisors can react very quickly to organize a team to fix the problematic items. Thus, the number of non-conformities generate by the digitized line is lower for 45%. Despite of this, the time required for correction of non-conformed items is lower by 46%. Regarding the costs for defects, for a period of 12 weeks, the total amount of costs in terms of poor quality calculated for the regular line is 3294 euros, while the total amount of costs incurred due to poor quality of the pilot line is 1780 euros. The average sum on daily bases is calculated, so the costs incurred on the regular line are 54.9 euros/day, while the costs arising on the line equipped with digital technology is 29.7 euros/day. According to the goal of this research, the benefits of the implementation of innovative digital solution on one of the production lines are more than clear.

CONCLUSION

This research contributes in a practical dimension by explaining the implementation of digital technology as a solid ground for further the implementation of Industry 4.0 techniques in the textile industries. In fact, the software systems integrated by the textile industry to collect and process data according to the performed operational tasks enable full monitoring of the production process and gathering the relevant information in real-time. Therefore, the goal of this research is fulfilled, the efficiency is increased, the number of non-conformities is decreased by 45% and the internal failure

costs are reduced by 46%. At the same time, delays are decreased for 46% and a flexible manufacturing process is designed.

However, using the software program based on the possibility of upgrading and fitting to the needs of the process and to the user's requirements is the company's advantage to fulfill the customer's expectation and achieve higher competitiveness in the market. Yet, the implemented digital technology for monitoring the manufacturing process in the textile factory is not an ultimate state. According to the findings, in the following period, the digitalization of the regular line is planned to be made. Despite that, the created digital platform is one-step toward the implementation of more advanced tools regarding Industry 4.0. To summarize, the implemented digital system for quality control and process monitoring can be recognized as an intelligent platform for further process improvement in the field of Industry 4.0. In addition, this smart platform will serve as a technology benchmarking for other textile factories, especially in emerging economy countries.

REFERENCES

Aguilar-Rodriguez, I.E., Bernal-Torres, C.A., Aldana-Bernal, J.C., Acosta-Aguinaga, A.G., Artieda-Cajilema, C.H. and Chala, P. (2021). Relationship between social culture, industry 4.0, and organizational performance in the context of emerging economies. *Journal of Industrial Engineering and Management*, 14(4), 750-770. https://doi.org/10.3926/jiem.3560

Ahmad, S., Miskon, S., Alabdan, R. and Tlili, I. (2020). Towards Sustainable Textile and Apparel Industry: Exploring the Role of Business Intelligence Systems in the Era of Industry 4.0. *Sustainability*, 12, 2632. doi:10.3390/su12072632

Balogun, A.-L., Tyler, D., Han, S., Moora, H., Paco, A., Boiten, V.J., Ellams, D. and Leal Filho, W. (2019). A review of the socio-economic advantages of textile recycling. *J. Clean. Prod*, 218, 10–20.

Carvalho, S., Portela, F., Santos, M.F., Abelha, A. and Machado, J. (2015). *Step towards of a homemade business intelligence solution - A case study in textile industry. In New Contributions in Information Systems and Technologies*, Springer: Berlin/Heidelberg, Germany.

Conci, A. and Proença, C.B. (2002). A system for real-time fabric inspection and industrial decision. *SEKE '02*.

Dalenogare, L.S., Benitez, G.B., Ayala, N.F. and Frank, A.G. (2018). The expected contribution of Industry 4.0 technologies for industrial performance. *International Journal of Production Economics*, 204, 383-394. https://doi.org/10.1016/j.ijpe.2018.08.019

Demeter, K., Losonci, D., Marciniak, R., Nagy, J., Moricz, P. and Matyusz, Z. (2020). Industry 4.0 through the lenses of technology, strategy, and organization: A compilation of case study evidence. *Vezetéstudomány / Budapest Management Review*, 51 (11), 14-25. https://doi.org/10.14267/veztud.2020.11.02

Denuwara, N., Maijala, J. and Hakovirta, M. (2019). Sustainability benefits of RFID technology in the apparel industry. *Sustainability*, 11, 6477.

Fatorachian, H. and Kazemi, H. (2018). The management of operations a critical investigation of Industry 4.0 in manufacturing: Theoretical operationalisation framework. *Prod. Plan. Control*, 29, 633–644.

Fogaça, D., Grijalvo, M., and Sacomano Neto, M. (2022). An Institutional Perspective in The Industry 4.0 Scenario: A Systematic Literature Review. *Journal of Industrial Engineering and Management*, 15 (2), 309-322. https://doi.org/10.3926/jiem.3724

Ghobakhloo, M., Fathi, M., Iranmanesh, M., Maroufkhani, P. and Morales, M.E. (2021). Industry 4.0 ten years on: A bibliometric and systematic review of concepts, sustainability value drivers, and success determinants. *Journal of Cleaner Production*, 302, 127052. https://doi.org/10.1016/j.jclepro.2021.127052

Grzybowska, K. and Łupicka, A. (2017). Key competencies for Industry 4.0. *Economics and Management Innovations*, 1 (1), 250-253. https://doi.org/10.26480/icemi.01.2017.250.253

Haseeb, M., Hussain, H.I., ´Slusarczyk, B. and Jermsittiparsert, K. (2019). Industry 4.0: A solution towards technology challenges of sustainable business performance. *Soc. Sci.* 8, 154.

Howaldt, J., Kopp, R., and Schultze, J. (2017). Why Industrie 4.0 Needs Workplace Innovation - A Critical Essay About the German Debate on Advanced Manufacturing. *Workplace Innovation*, 45-60. Springer International Publishing. https://doi.org/10.1007/978-3-319-56333-6_4

Iqbal, M., Soomrani, A.R. and Butt, S.H. A study of big data for business growth in SMEs: Opportunities & challenges. *In Proceedings of the International Conference on Computing, Mathematics and Engineering Technologies* (iCoMET), Sukkur, Pakistan, 3 - 4 May, 2018.

Imran, M., Hameed, W. and Haque, A. (2018). Influence of Industry 4.0 on the Production and Service Sectors in Pakistan: Evidence from Textile and Logistics Industries. *Soc. Sci., 7*, 246. https://doi.org/10.3390/socsci7120246

Istrat, V. and Lali´c, N. (2017). Association rules as a decision making model in the textile industry. *Fibres Text. East. Eur*, 25, 8–14.

Khorram, M., Torabi, S.A. and Nonino, F. (2019). Why manufacturers adopt additive manufacturing technologies: The role of sustainability. *J. Clean. Prod*., 222, 381–392.

Lee, C., Huang, G.-H. and Ashford, S.J. (2018). Job insecurity and the changing workplace: Recent developments and the future trends in job insecurity research. *Annual Review of Organizational Psychology and Organizational Behavior*, 5 (1), 335-359. https://doi.org/10.1146/annurev-orgpsych-032117-104651

Lekamge, R. and Ekanayake, N. (2021). Internal Quality Failures of Apparel Industry: A Case from Sri Lanka. *Open Journal of Business and Management*, 9, 2389-2406. doi: 10.4236/ojbm.2021.95129.

Longo, F., Nicoletti L. and Padovano, A. (2017). Smart operators in industry 4.0: A human-centered approach to enhance operators' capabilities and competencies within the new smart factory context. *Comput. Ind. Eng*., 113, 144–159.

Fromhold-Eisebith M., Marschall P., Peters R. and Thomes P. (2021). Torn between digitized future and context dependent past – How implementing 'Industry 4.0' production technologies could transform the German textile industry, *Technological Forecasting and Social Change*, 166, 120620. https://doi.org/10.1016/j.techfore.2021.120620.

Meyer, U. (2019). The emergence of an envisioned future. Sensemaking in the case of "Industrie 4.0" in Germany. *Futures*, 109, 130-141. https://doi.org/10.1016/j.futures.2019.03.001

Judit, O., Karmazin, G., Pet˝o, K. and Popp, J. (2018). Information technology developments of logistics service providers in Hungary. *International Journal of Logistics Research and Applications*, 21, 332–44.

Rajnoha, R. and Lesníková P. (2016). Strategic performance management system and corporate sustainability concept-specific parametres in Slovak Enterprises. *Journal of Competitiveness*, 8, 107–24.

Schneider, P. (2018). Managerial challenges of Industry 4.0: An empirically backed research agenda for a nascent field. *Review of Managerial Sciencie*, 12 (3), 803-848.

Shahriar, A., Wamba, S., Gunasekaran, A., Dubey R. and Childe. S.J (2016). How to improve firm performance using big data analytics capability and business strategy alignment? *International Journal of Production Economics*, 182, 113–31.

Singh, R.K., Kumar, P. and Chand, M. (2019). Evaluation of supply chain coordination index in context to Industry 4.0 environment. *Benchmarking*, 28 (5), 1622-1637. https://doi.org/10.1108/BIJ-07-2018-0204

Stentoft, J. and Rajkumar, C. (2020). The relevance of Industry 4.0 and its relationship with moving manufacturing out, back and staying at home. *International Journal of Production Research*, 58 (10), 2953-2973. https://doi.org/10.1080/00207543.2019.1660823

Tortorella, G.L., Cawley Vergara, A.M., Garza-Reyes, J.A. and Sawhney, R. (2020). Organizational learning paths based upon industry 4.0 adoption: An empirical study with Brazilian manufacturers. *International Journal of Production Economics*, 219, 284-294. https://doi.org/10.1016/j.ijpe.2019.06.023

Trieu, V. (2017). Getting value from business intelligence systems: A review and research agenda. *Decis. Support Syst*, 93, 111–124.

Wang, L. and Shen, B. (2017). A product line analysis for eco-designed fashion products: Evidence from an outdoor sportswear brand. *Sustainability*, 9, 1136.

Wang, S., Wan, J., Li, D., and Zhang, C. (2016). Implementing smart factory of industrie 4.0: An outlook. *International Journal of Distributed Sensor Networks*, 37, 517-527. https://doi.org/10.1155/2016/3159805

Wollschlaeger, M., Sauter, T., and Jasperneite, J. (2017). The future of industrial alcohols. *IEEE Industrial Electronics Magazine*, 11 (1), 17-27. https://doi.org/10.1109/MIE.2017.2649104

ASSESSMENT OF THE VITALITY OF ORGANIZATIONAL LEARNING, CUSTOMER FOCUS, AND CONTINOUS IMPROVEMENT IN MACEDONIAN FOOD PROCESSING INDUSTRY FROM TQM PERSPECTIVE

Marija Stanojeska
Part-time Professor, UACS, School of Business Economics and Management, Skopje, RNM
E- mail: marija.stanojeska@uacs.edu.mk
Robert Minovski
Professor, Ss. Cyril and Methodius University in Skopje, Faculty of Mechanical Engineering, RNM
Bojan Jovanoski
Assistant Professor, Ss. Cyril and Methodius University in Skopje, Faculty of Mechanical Engineering, RNM

ABSTRACT

In today's dynamic environment, where time often plays the most important role, it is particularly essential to plan the dynamics of the development of every system, including the Quality Management System (QMS). It is simply not enough to create a good QMS. Namely, it is generally accepted that QMS are quite weak and vulnerable just after certification So, it is very important to maintain and foster its evolution throughout time. Analysis of the dynamic development of the QMS represents a quite vague research area, because of the complexity of the process and numerous influential factors. Still, the growth of the QMS can be related to the (successful) implementation of the Total Quality Management (TQM) practices, like organizational learning, customer focus, and continuous improvement. Nevertheless, the two challenges of this research are to assess the importance of those TQM practices and to determine the duration to ascertain the improvement of the organizational learning, customer focus, and continuous improvement. In that direction, a survey of 82 companies in the Macedonian food processing industry was conducted, using a structured questionnaire. The results of the conducted survey indicate the employees have to direct almost similar efforts of their commitment toward continuous improvement, organizational learning, and customer focus, based on the determined ratio between analyzed TQM practices is as follows, CI (%) : OL (%) : CF (%) = 33.8 : 31.9 : 34.3. Regarding the second challenge, the period of perceived improvements of continuous improvement, organizational learning, and customer focus is different and respected in each TQM practice. To determine the selected three TQM practices, organizational learning, customer focus, and continuous improvement, a survey of 82 companies in the Macedonian food processing industry was conducted, using a structured questionnaire.

Key words: Organizational learning, Continous improvement, Customer focus, QMS and TQM practices.

INTRODUCTION

In healthy business culture, what is good for the organization and the customers come together and become a driving force. Thus, it is important that the quality management system (QMS) adds value to organizations (Gremyr et al., 2021). At the same time, the evidence suggests that QMS provides a critical structure with the potential to create value for customers, contribute to product quality and operational performance (Kafetzopoulos et al., 2015), and increase net assets value (Ochieng et al., 2015). This potential, however, has not yet been fully exploited. From this point of view, all the different factors for improving QMS and its transition to more advanced levels through the implementation of total quality management (TQM) practices are explored (Respati and Ami, 2014; McLein et al, 2017; Oliveira et al., 2017). The importance of TQM practices, such as top management commitment, customer focus, process management, quality information management, supplier management, remains the focus of numerous studies (McLein et al., 2017).

However, the discussion regarding the initiatives for the implementation of new methodologies always starts from the top management but does not depend only on their commitment. It is well known that top management plays a key role in establishing quality policies, providing resources, and stimulating employee involvement (Dubey et al., 2012). In addition, employees are implementers and supporters of all ideas generated by top management and their role can be significant in the process of implementing TQM practices within organizations (Das et.al., 2008). Therefore, some of the influential aspects that can contribute to the complexity of the QMS development process will be discussed here, focusing mainly on TQM practices - organizational learning, customer focus, and continuous improvement, because they were included in the system dynamics model designed to transition QMS to TQM under the influence of top management commitment and its employee motivation stimulus (Stanojeska et al., 2020).

Motivated employees and the learning capacity of the organization are essential for the organization to achieve excellent service quality. Hays and Hill, (2001) defined organizational learning as the development and implementation of new knowledge to change employee behavior, which in turn will strengthen the organization to achieve improved results, adaptability to change, growth through innovation, and create employee-oriented results.

Customer focus is considered to be one of the main drivers and a key factor in the long-term success of an organization. From that point of view, customer satisfaction measures are used to understand the factors that drive the market (Khan, 2011).

As one of the influential factors of TQM, continuous improvement is a constant effort to improve products, and operations. In fact, processes valued by customers are constantly being evaluated and improved in the light of their efficiency, effectiveness, and flexibility (Lenning and Gremyr, 2017).

The purpose of this paper is to explore how these three TQM practices correlate with quality management perceptions. This study focuses on ISO 9001, ISO 22000, and HACCP-certified food production organizations. This data was used to create a dynamic model for improving the status of QMS. In the next section, some background on the use of QMS and improvement of the current state of QMS development, TQM practices are given, followed by findings, and discussion of findings. Finally, conclusions are drawn in the last section of the paper.

LITERATURE REVIEW

The importance of the QMS in current competitive environments has already been confirmed (Solomon et al., 2017; Fonseca et al., 2017). In the paper of Brown and Wiele (1996), it was concluded that the role of the top management whose responsibility is to provide adequate training for the employees for improvement of QMS is emphasized. Therefore, the inclusion of employees should be permanently encouraged and strengthened, through the managing the strategy of top management. According to Swartling and Poksinska (2013), continuous improvement within the organizations is enabled through the introduction of mechanisms for motivation of the employees, which leads to a higher level of their involvement. Most researchers found that employees' involvement is among the most reported influential factors in direction of improvement of the state of the QMS (Jurburg et al., 2016; Dubey and Bansal, 2012; Swartling and Poksinska, 2013). Indeed, if the level of employee involvement is higher, the implementation of TQM practices will be more successful and will be performed in a shorter period. In this paper, research on customer satisfaction, organizational learning, and continuous improvement is conducted. The brief literature review related to each of the three TQM practices is following. The satisfaction of customers is at the core of TQM. Customer focus is evident in a proactive approach to identifying customers' psychological, emotional, and business needs, and their fulfillment (Anil and Satish, 2017). As mentioned before, the goal of satisfying the customer is essential to QMS and it is expressed by the organization's attempt to understand current and future customer needs, and by meeting customers' requirements through designing and delivering quality products and services. (Mosadeghrad, 2014; Dubey and Bansal, 2012; Somlea et al., 2014;

Anil and Satish, 2017). Another treated area in the study is organizational learning. Organizational learning is one of the main resources to achieve and maintain competitive advantage, efficiency, and growth for organizations (Lagrosen, 2017). The organization's ability to preserve, retrieve, and apply new knowledge, values, attitudes, and skills plays a critical role in organizational learning (Koh and Low, 2010). Learning ensures that mistakes are not repeated and more important the learning that is applied to the existing processes, the process task knowledge and of foundational knowledge on organizational systems the profound knowledge stimulates continuous improvement (Hao and Yunlong, 2013). The third TQM practice is continuous improvement. Namely, constant improvement in products, services, and processes is essential to respond to changing customers' preferences (Juran, 1995). Reevaluation of existing services and processes is important to affect improvements (Khan, 2011). This approach facilitates innovations, reduction in delivery time, costs associated with the repair, rework, and yields cost competitiveness. (Mardani and Kazemilari, 2012; Jurburg et al., 2016). These three factors, are significant determinants of the state of the QMS (Carmona-Márquez et al., 2016; Sisnuhadi, 2014;).

CONCEPTUAL MODEL AND RESEARCH METHODOLOGY

As mentioned earlier, this research is a part of the efforts for modeling the of the development of the QMS towards TQM. The conceptual model of that model is presented in Figure 1 (Stanojeska et al., 2020).

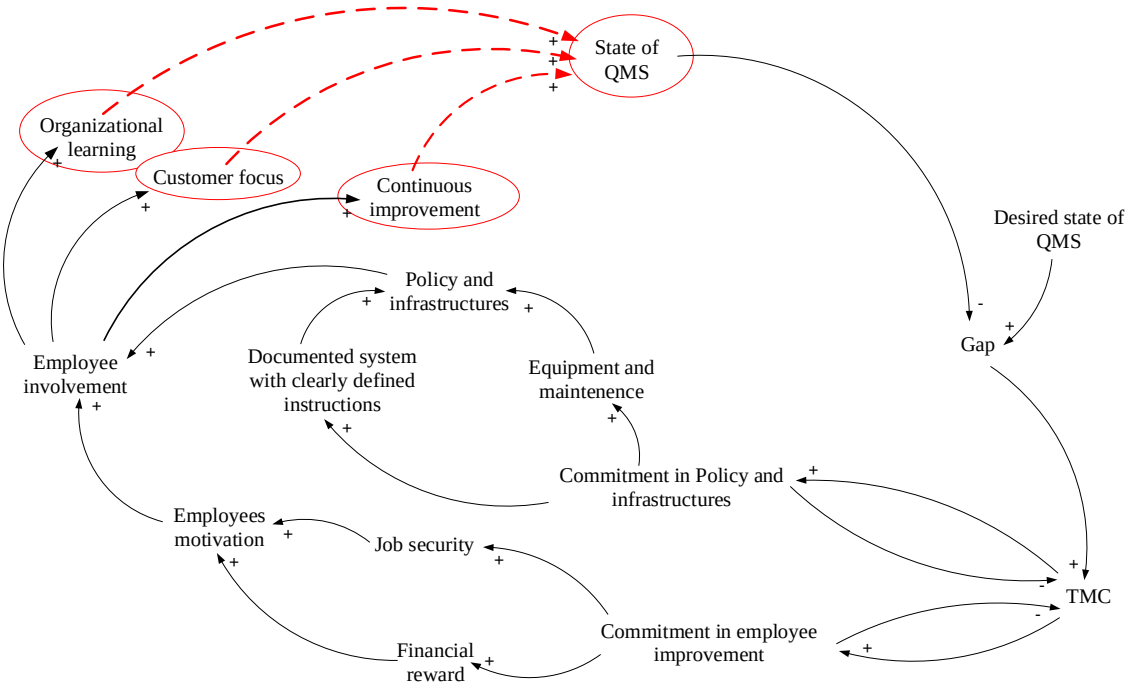


Figure 1: Conceptual model of the improvement of the state of QMS

In this occasion the detailed explanation of the model will be skipped. The focus will be on the correlation of the three main influencing variables on the state of the QMS – organizational learning, customer focus and continuous improvement (marked with dotted lines in Fig. 1), since it is the main topic of this paper. The research methodology includes two steps. The first step refers to the validation of the correlation between the variables (in the whole conceptual model), through a review of the literature sources. The research findings are presented in Table 1. These findings validated the correlation between the state of QMS and the three TQM practices - organizational learning (OL), continuous improvement (CI), and customer focus (CF), (Stanojeska et al., 2016).

Table 1: Overview of literature: Validation of correlations included in the conceptual model

Correlation between TQM practices		**Literature source**
State of QMS	CI	Anil and Satish, (2017), Mardani et al. (2012), Koh et al. (2010), Das et al. (2008), Dubey (2012), Swartling and Poksinska (2013), Jurburg et al. (2016).
	OL	Lagrosen (2017), Tamayo-Torres et al. (2014), Das et al. (2008), Koh and Low (2010), Hao and Yunlong (2013), Sisnuhadi (2014).
	CF	Mardani et al. (2012), Dubey et al. (2012), Mosadeghrad (2014), Dubey and Bansal (2012), Somlea et al. (2014), Anil and Satish (2017), Sisnuhadi (2014).

Nevertheless, the process of designing a functional dynamic model requires the use of quantified data. From that point of view, the second step of the research methodology was focused on conducting a survey using a structured questionnaire. In fact, this research faces two challenges: (1) assessment of the contribution of CI, OL, and CF towards the improvement of the state of QMS and (2) determining the period of perceived improvements of the aforementioned TQM practices. In other words, the goals of this research are:

G1: Assessment of the vitality of continuous improvement, organizational learning, and customer focus in direction of improvement of the state of QMS in Macedonian food processing industries.

G2: Valuation of the period of perceived improvements of continuous improvement, organizational learning, and customer focus.

RESULTS AN DISCUSSION

Data collection from the survey

According to the defined goals, an assessment of the importance of CI, OL, and CF, was conducted through a survey with the Macedonian food processing industry. To clarify, the questionnaire included three sections, and within one of the sections, the three TQM practices were treated. So, this paper draws on a questionnaire section focusing on the management's perceptions regarding the importance of each of those three TQM practices and the duration of ascertaining the improvement of OL, CI, and CF. The questionnaire included a brief explanation intended for the managerial level responders, based on qualitative data developed through the validated findings presented in Table 1. According to the researches findings - the increasing the level of OL, CI, and CF in the organization leads to improving the overall quality system and more efficient implementation of TQM practices in the organization, the responders assess the importance of the TQM practices and the duration to ascertain the improvement of Ol, CI, and CF, using quantitative (numerical) values.

The questionnaires were distributed to 112 registered food Macedonian production organizations, with valid ISO 9001 (27%), ISO 22000 (32%), or HACCP certificates (41%). A total of 82 food processing organizations participated in the survey, resulting in a response rate of 73%. The participation of surveyed organizations according to the criterion of number of employees was 43% of small organizations (number of employees less than 50), 44% of medium-sized organizations (number of employees 50-251), and 13% of large organizations (number of employees up to 251). The research covered various types of food production (beverages industry – 16%, baking industry -13%, fruit, and vegetables industry – 12%, dairy industry – 10%, meat industry – 10%, milling industry - 8%, etc.). The respondents of this study were quality managers (49%), production managers (26%), and directors (25%).

Discussion of the results

As previously mentioned, to bring the idea closer to the respondents, a schematic overview of the impact of employee involvement through OL, CF, and CI, on the implementation of TQM practices,

which leads to improving the state of QMS is given. In this context, the impact of the three TQM practices is examined separately. The results of the conducted survey are shown in Table 2.

Table 2: Assessment of the importance of TQM practices

TQM practice	**Assessment of the importance of TQM practices**
Organizational learning	31.9 %
Customer focus	34.3 %
Continuous improvement	33.8 %

It is obvious that the importance of the TQM practices is similarly assessed, which means all three practices have a comparable impact (Fig. 2.). The importance of CF is highest rated with 34.3%, and the importance of OL is rated at 31.9%. The value of the rating of CI is 33.8%. The results of the conducted survey indicate that all three practices are almost equally important, which is consistent with the theoretical claims confirmed by numerous researchers. Generally, one can conclude the respondents in the Macedonian food processing industry are sufficiently aware of the vitality of the proposed TQM practices. Therefore, the first goal is achieved, which states all TQM practices are equally important for improving the state of QMS in the Macedonian food processing industry.

Furthermore, the second topic of the survey, which means the investigation of the minimum duration required for the enhancing of TQM practices (CF, CI, and OL) from the moment of active inclusion in the QMS, is estimated (Table 3).

Table 3: Assessment of the period of perceived improvements of TQM practices

TQM factor	**Assessment of the period of perceived improvements in months**
Organizational learning	5.5
Customer focus	7.0
Continuous improvement	9.1

According to the respondent's opinion, once the motivation of the employees is implemented, 7 months are needed to improve the CF. A slightly shorter duration is required to enhance OL (5.5 months). Notably, the longest period of 9.1 months is required to achieve CI (Fig. 3.).

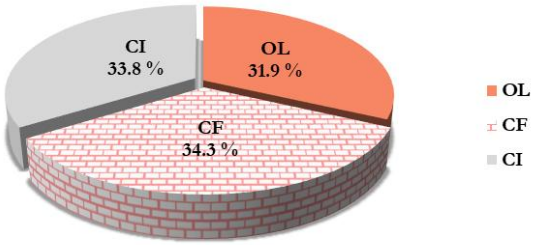


Figure 1: Period of perceived improvements of OL, CF and CI.

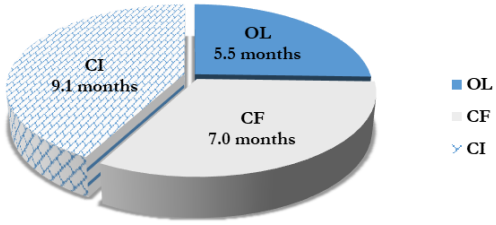


Figure 2: Period of perceived improvements of OL, CF and CI.

The findings of the accomplished values for perceived improvements of TQM practices fulfill the investigation regarding the period of perceived improvements of CI, OL, and CF. Thus, the second goal is accomplished.

CONCLUSION

The main objective of the presented research is to evaluate the importance of the three TQM practices, continuous improvement, organizational learning, and customer focus concerning the maturity/evolution of the QMS. Besides that, the duration of perceived improvement of those TQM practices is investigated. The methodology was based on gathering quantitative and qualitative data. Qualitative data were generally gathered through a literature review, and as a result of the input from senior practitioners and researchers. Quantitative data were collected through a conducted survey using a structured questionnaire. All respondents included in the research belong to the managerial level. The research was carried out in the Macedonian food processing industry. The results of the conducted survey indicate that the highest improvement of the state of QMS is obtained when the ratio between analyzed TQM practices is as follows, CI (%) : OL (%) : CF (%) = 33.8 : 31.9 : 34.3. That means employees have to direct almost equal efforts of their dedication toward continuous improvement, organizational learning, and customer focus. Such optimal distribution of the commitment to all TQM practices allows improvement of the state of QMS efficiently and effectively, towards successful implementation of the TQM concept. Besides that, the period of time from the initial implementation of each of the TQM practices was investigated using the questionnaire. According to the collected and processed data, the period of perceived improvement of organizational learning and customer focus (5.5 months and 7.0 months respectively), is shorter than the required period (9.1 months) for perceiving enhancements of continuous improvement. The gathered results are quite expected because of the fact that continuous improvement occurs as a logical consequence of preceding improvements in both TQM practices, organizational learning, and customer orientation.

The results obtained in this research were used to create a system dynamics model for improving the state of QMS towards TQM, under the influence of employees' involvement and their motivation encouraged by top management..

REFERENCES

Anil, A.P. & Satish, K.P. (2017). Enhancing customer satisfaction through total quality management practices – an empirical examination. *Total Quality Management & Business Excellence,* 28 1-21, (1528-1548).

Brown, A., and Wiele, T. (1996). A Tipology of Approaches to ISO Certification and TQM, *Australian Journal of Management*, 21 (1), 57-72.

Carmona-Marquez, F.J., Leal-Millan, A.G., Vasquez-Sanchez, A.E., Leal-Rodrigez, A.L. and Eldridge, S. (2016). TQM and business success. Do all the TQM drivers have the same relevance? An empirical study in Spanish firms. *International Journal of Quality & Reliability Management,* 33 (3), 361-379.

Das, A., Paul, H. and Sweirczek F.W. (2008). Developing and validating total quality management (TQM) constructs in the context of Thailand's manufacturing industry. *Benchmarking: An International Journal,* 15 (1), 52–72.

Dubey, S.K. and Bansal, S. (2012). Barriers in implementing radical/incremental changes in manufacturing - based government organizations, *Australian Journal of Business and Management Research*, 2 (2), 48-59.

Fonseca, L.M., Domingues, J.P., Machado, P.B. and Calderón, M. (2017), Management System Certification Benefits: Where Do We Stand? *Journal of Industrial Engineering and Management,* 10 (3), 476-494.

Gremyr, I., Lenning J., Elg M., Martin J., (2021), Increasing the value of quality management systems, *International Journal of Quality and Service Sciences*, 13 (3), 381-349.

Hays, J.M. and Hill, A.V. (2001). A preliminary investigation of the relationships between employee motivation/vision, service learning, and perceived service quality. *Journal of Operations Management,* 19, (3), 335-349.

Hao, Z.Z. & Yunlong, D. (2013). Research on the relationship of institutional innovation, organizational learning and synergistic effect: An empirical study of Chinese university spin-offs. *Journal of Industrial Engineering and Management,* 7 (3), 645-659.

Juran, J.M (1995). *A History of Manging for Quality*. Milwaukee, MI: ASQC Quality Press.

Jurburg, D., Viles, E., Tanco, M. and Mateo R. (2016). What motivates employees to participate incontinuous improvement activities? *Total Quality Management & Business Excellence*, 28 (13-14), 1469-1488.

Kafetzopoulos, D., Gotzamani, K. and Gkana, V. (2015), Relationship between quality management, innovation and competitiveness. Evidence from Greek companies, *Journal of Manufacturing Technology Management*, 26 (8), 1177-1200.

Khan, M. (2011). Total Quality management and organizational performance – moderating role of managerial competencies, *International Journal of Academic Research*, 3 (5), 453-458.

Koh, T.Y. and Low, S.P. (2010). Empiricist Framework for TQM Implementation in Construction Companies., *Journal of management in engineering*, 26 (3), 133-143.

Lagrosen, Y. (2017). The Quality Café: developing the World Café method for organizational learning by including quality management tools. *Total Quality Management & Business Excellence,* 28 (13-14), 1-13.

Lenning, J. and Gremyr, I. (2017). Making internal audits business-relevant. *Total Quality Management and Business Excellence*, 28 (9/10), 1106-1121.

Mardani, A. and Kazemilari, M. (2012). Relationship between national culture and TQM implementation, Case study: Iranian multinational electrical manufacturing companies, *Asian Journal of Management Research*, 3 (1).

McLein, R.S., Antony, J. and Dahlgaard, J.J. (2017). Failure of Continuous Improvement initiatives in manufacturing environments: a systematic review of the evidence, *Total Quality Mangement & Business Excellence*, 28 (3-4) 219-237.

Mosadeghrad, M. (2014). Why TQM programmes fail? A pathology approach. *The TQM Journal,* 26 (2), 160-187.

Oliveira, G.S., Correa, J.E., Balestrassi, P.P., Martins, R.A. and Turrioni, J.B. (2017). Investigation of TQM implementation: empirical study in Brazilian ISO 9001-registered SMEs. *Total Quality Management & Business Excellence, 28 (5-6),* 1-19.

Ochieng, J., Muturi, D. and Njihia, S.N. (2015), The impact of ISO 9001 implementation on organizational performance in Kenya, *The TQM Journal*, 27 (6), 761-771.

Respati, H., and Ami, R. (2014). Research on Continues Mediation: Employee Behaviour and TQM Practice as ISO 9000 Strategy to Improve Performance of Manufacturing Company in East Java, Indonesia, European Journal of Business and Management, 6 (29), 125-136.

Sisnuhadi, D. (2014). The relationship between soft factors and hard factors of TQM practices and organizational learning, *European scientific Journal*, 10 (7), 85-99.

Solomon, N.P., Bester, A. and Moll, M. (2017). Diffusion of a quality management system: A case study, *South African Journal of Industrial Engineering,* 28 (2), 149-164.

Somlea, I.N.H., Marian, L. and Ferencz, I.S. (2014). Customer satisfaction analysis by the implementation of Quality Management System in a public institution. *Procedia Economics and Finance*, 15, 1071-1076.

Stanojeska, M., Minovski, R., and Jovanovski, B. (2020). Top management role in improving the state of QMS under the infuence of employee's involvement: Best practice from the food processing industry, *Journal of Industrial Engineering and Management, JIEM,* 13 (1), 73-89.

Stanojeska, M., Minovski R. and Jovanoski B. Top Management role in improving the state of QMS through management of employee motivation, *VI International Symposium Engineering Management and Competitiveness, EMC,* June 17-18, Kotor, Montenegro, 2016.

Swartling, D., and Poksinska, B. (2013). Management Initiation of continuous improvement from a Motivationlal perspective, *Journal of Applied Economics and Business research,* 3 (2), 81-94.

Tamayo-Torres, J., Gutierrez-Gutierezz, L.J., and Ruiz Moreno, J. (2014). The relationship between exploration and exploitation strategies, manufacturing flexibility and organizational learning: An empirical comparison between non-ISO and ISO certified firma. *European Journal of Operational Research,* 232 (1), 72-86.

OPERATIONAL MANAGEMENT OF PRODUCTION IN SMALL AND MEDIUM ENTERPRISES IN SERBIA

Ljiljana Stošić Mihajlović
Academy of Technical and Vocational Studies, Nis - Department in Vranje, Serbia
E-mail: ljiljana.stosic.mihajlovic@akademijanis.esu.rs

ABSTRACT

The most important area of management in any business, and especially in production, is operational management, and it is of crucial importance in small and medium enterprises. Small and medium enterprises are a generator of economic growth, employment and increasing living standards and prosperity of each country, even in Serbia, where they make up almost 99% of the total number of enterprises. The aim of this paper is to point out the specifics and importance of operational management in production in the sector of small and medium enterprises in Serbia. Unlike strategic management, which is focused on economic efficiency, operational management is focused on economic efficiency and rational use of total available human, financial and material resources, when transforming inputs into outputs. In large companies, the roles of strategic and operational managers are clearly divided and a defined order of decision-making and implementation in small business is not the case. In small companies, these roles change and intertwine, and the owner is both a strategist and an operative, who also performs all management functions. To succeed, he needs different knowledge, competencies and skills, entrepreneurial spirit, creativity, and innovation.

Key words: Operational management, Production, Organizational structure, Small and medium enterprises.

INTRODUCTION

The need for management also exists in the sector of small and medium enterprises, as well as in all organizations in which there are people and resources and in which it is necessary to achieve results within a certain period of time. In essence, management is the management of people, resources and processes, so it is necessary in organizations of all shapes, types and sizes. In the context of managing specific situations and categories, there is crisis management, project management, marketing management, financial management, change management, quality management, operational management and others. Operational management in production ensures the transformation of strategic long-term plans into operational plans - actions. Carriers of operational activities are managers who are at the lower or middle level, depending on the form of organization of the company and its size. Operational management is a rather complex process of coordinating and directing operational activities, and in order to succeed, operational management must ensure the structure and required quality of resources, and these resources should be directed towards the desired goal expressed in financial rate of return. In the implementation of operational management, defined operational goals and strategies for individual business functions (production, procurement, sales, logistics, marketing) as well as for work operations and work tasks. When goals are allocated to business functions and to the direct production process, it means that goals and results are measurable. Measurability of operational results is the main feature of operational management.

ON OPERATIONAL PRODUCTION MANAGEMENT

Operational production management is the process of systematic directive and control of operations in which the purchased inputs are transformed into finished products, goods and services. Operational management includes such activities as procurement, inventory control, quality control of procured

materials and maintenance. Operational management includes the management of transformation processes in material production and in the production of services, in an efficient manner. Operational production management includes both the management of the transformation processes of material production and the transformation processes of the service industry.

The work of the operational manager is conditioned not only by the need to know how much material is needed for the production process, but also when the material needs to be ordered, ie procured from the supplier. Two basic methods are used to determine when a material should be ordered: the fixed quantity method and the fixed period method. The application of one or the other method depends on several circumstances, but above all on market conditions, on the possibility of finding the necessary materials on the market.

For practice, the simplest is the inventory control system using the ABC method. It should be noted that this method of inventory management is based on the value of individual materials used in the production process of the company. Many companies have a small number of materials that fall into group A, but their greatest value is in total stocks. Materials entering group B have a relatively small value, and materials entering group C have a very small value of inventory.

Before the material enters the production process and its storage, it is necessary to control its quality and quantity. When the control of the procured material is performed, a report is made and only then the material can be received, stored and recorded as a stock. If the quality control commission finds that the purchased material is not in accordance with the provisions of the contract, then the material is temporarily disposed of and an appropriate complaint is made, which aims to force the supplier to act in accordance with the contract. The management of the company can act in three ways: to return the purchased materials, to seek elimination of identified deficiencies on the spot, if possible, and to accept materials, if the deficiencies are not such that they will interfere with production and affect standard product quality, with certain collections included in the price.

SMALL AND MEDIUM ENTERPRISES IN SERBIA AND THE IMPORTANCE OF OPERATIONAL MANAGEMENT

The importance of small business for the economy of every country is indisputable. How successful a small business is largely depending on the knowledge and skills of management needed to make and implement business decisions. Observed from the aspect of the objectives of the field of activity, and the methods used, management has its strategic and operational component with its own characteristics and specifics. In this paper, we will deal with its operational component and point out its specifics and importance in small business. Operational management is focused on production management, regardless of whether they are material products or services, which along with marketing and finance is one of the three basic functions in every company. Operational management represents the key processes in the organization when converting inputs into outputs. During these processes, new values are created that are offered to customers in the market in the form of material products or services. What Strategic Management outlines in the plans, operational management must translate into practice. While strategic management is focused on economic effectiveness (doing the right thing), operational oversees economic efficiency (doing the right thing). Thus, operational management is focused on the design, production, delivery and improvement of products and services. Effective operational management raises productivity and quality of products and services. In large companies, top management delegates operational management tasks to lower levels of management in order to achieve strategic goals. In a small business, the situation is different, because the owner usually performs both tasks.

THE INFLUENCE OF SMALL BUSINESS ON THE OVERALL ECONOMIC DEVELOPMENT OF SERBIA

for In the 21st century, which will be marked by globalization and entrepreneurship, small business is a driver of development, creator of new jobs and generator of growth of living standards (Mahmutović, Kulović, 2010). According to the Eurobarometer Team of the European Commission (2007) in the

European Union of over 200 million companies, 99% are small and medium-sized, and of that number as many as 93% are companies with less than 10 employees. Innovation is their key feature. More than 60% of employees in the European Union work in small and medium-sized enterprises. These companies are not evenly distributed across sectors, with a significantly larger number belonging to the service sector than the manufacturing sector, which can simply be explained by the smaller capital needed to start a business. The largest turnover is realized by trade companies, which at the same time employ the largest number of workers. These data lead us to the conclusion that small companies play an important role in the economy of the European Union in terms of their number, number of employees and income. The situation is similar in the USA, where in the period from 1990 to 2003, in small companies with less than 20 employees, almost 80% of new jobs were created. Thus, small businesses are becoming more and more competitive with large companies locally, but lately more and more globally.

The competitive advantage of small businesses is most pronounced in the field of flexibility and innovation. Although large companies have incomparably more resources, have a built reputation and operate in markets with only a few participants, small companies have a greater innovative capacity. Simeonydis (1996) argues that small enterprises with less than 100 employees most often do not formally develop a research and development function, however most innovation comes from these enterprises. Small businesses are key innovators in today's economy and market leaders in many areas. However, in the conditions of globalization and intensified competition for innovation and economic success, it is necessary to have and interconnect small and large enterprises. By establishing cooperation relations with small companies, large companies can significantly reduce costs in certain business segments, which significantly contributes to improving the competitiveness of both large companies and the economy. Aware of the importance and role of small business for overall economic development, developed countries stimulate its development in various ways. This is primarily reflected in the removal of business barriers, creating a favorable macroeconomic environment, educating entrepreneurs, providing financial support, establishing special institutions to support small businesses, etc.

In Serbia, almost all large companies were liquidated during the transition. Small and medium enterprises are expected to become the engine of future economic development and significantly contribute to the country's dynamic transition process and the creation of conditions for Serbia to become a member of the European Union.

In 2020, there was an increase in the total number of registered business entities by 9,879 compared to the beginning of 2019, it is stated in the announcement of the Agency for Business Registers. In 2020, the establishment of 9,176 companies and 29,810 entrepreneurs was registered, which is 19 percent more companies than in 2019, but also about 25 percent fewer entrepreneurs compared to 2019. Most of the companies founded in 2020 registered the following activities: non-specialized wholesale trade, computer programming, construction of residential and non-residential buildings, consulting activities related to business and other management.

These are road freight transport, restaurant and mobile catering activities, retail trade via mail order or internet, information technology consultancy, engineering and technical consultancy, rental and management of own or leased real estate. Most entrepreneurs registered for the following activities: restaurants and mobile catering facilities, consulting activities related to business and other management, hairdressing and beauty salons, road freight transport, maintenance and repair of motor vehicles, beverage preparation and serving services, other unmentioned specific construction works, computer programming, engineering activities and technical consulting, installation of floor and wall coverings.

At the beginning of 2022, 414,705 business entities were registered on the territory of the Republic of Serbia, 124,260 active companies and 290,445 entrepreneurs. That is 14,059 entities, 2,570 companies and 11,489 entrepreneurs, more than at the beginning of 2021. In 2021, 9,635 companies were established, 459 more than in 2020, and 478 more than in 2019. Also, 34,378 entrepreneurs were established, 4,568 more than in 2020, but 2,782 less than in 2019, the before COVID-19- year, in which 37,160 entrepreneurs were founded. Out of a total of 44,013 business entities established in the past year, 8.14%, or 3,584 entities, were established through electronic registration.

Among the established companies, the TOP 10 activities include: non-specialized wholesale, construction of residential and non-residential buildings, computer programming, consulting activities related to business and other management, road freight transport, restaurant and mobile catering activities, retail trade through mail or via the Internet, engineering and technical consultancy, rental and management of own or leased real estate, information technology consultancy.

Among newly established entrepreneurs, the TOP 10 activities include: activities of restaurants and mobile catering facilities, consulting activities related to business and other management, road freight transport, activities of hairdressing and beauty salons, maintenance and repair of motor vehicles, computer programming, preparation and serving services beverages, engineering activities and technical consulting, other unmentioned specific construction works, installation of floor and wall coverings.

In 2021, 7,046 companies were deleted from the Register of Business Entities, which is 936 less than in 2020. In order to correctly understand the comparative data on deleted companies in 2019, it is important to remind that 27,163 companies were deleted in that year, but 24,380 companies were deleted from the register ex officio, after the forced liquidation procedure. with companies that have not submitted financial reports for two consecutive years, but also for other reasons prescribed by the Law on Companies, have acquired the conditions for initiating this procedure. In 2019, APR conducted the procedure of forced liquidation for the first time, so that in that year the number of deleted persons increased many times compared to all previous and years that followed 2019, so that these data are not comparable. Also, 22,934 entrepreneurs were deleted from the register, 882 less than in 2020, and 659 less than in 2019.

Among the deleted companies, the TOP 10 activities include: non-specialized wholesale trade, consulting activities related to business and other management, restaurant and mobile catering activities, construction of residential and non-residential buildings, road freight transport, computer programming, retail in non-specialized stores, mainly food, beverages and tobacco, trade of cars and light motor vehicles, activity of advertising agencies, other retail trade in non-specialized stores.

Among the deleted entrepreneurs, the TOP 10 activities include: activities of restaurants and mobile catering facilities, beverage preparation and serving services, computer programming, hairdressing and beauty salons, taxi transport, consulting activities related to business and other management, retail trade in non-specialized shops, mainly food, beverages and tobacco, road freight transport, maintenance and repair of motor vehicles, production of bread, fresh pastries and cakes (data from the Republic Bureau of Statistics).

A set of new laws in line with European Union standards, and reform of the fiscal and financial system has significantly improved the business environment for small businesses. However, small businesses in Serbia face various barriers such as difficult access to funding sources, insufficient entrepreneurial and managerial knowledge, unavailability of market information and lack of specialized services.

Table 1: Employees in legal entities (companies, enterprises, cooperatives, institutions, and other organizations), self-employed persons, entrepreneurs, and their employees

	Number of employees	**Changes compared to the previous year**	
	2021.	Differences	Indices
Total employees	2212631	63532	103,0
Employees in the workplace	2154412	68033	103.3
Employees in legal entities	1759549	56953	103,3
Entrepreneurs	391863	11080	102.9
Total employees out of the relationship	61219	-4501	93,2
Employees in legal entities	57165	-4366	92,9
Entrepreneurs and persons who independently perform their activity	4054	-135	96,8

Source: publikacije.stat.gov.rs/G2022/G20221023.html

RELATIONSHIP BETWEEN STRATEGIC AND OPERATIONAL MANAGEMENT IN THE STRUCTURE OF SMALL AND MEDIUM ENTERPRISES

Management is a universal activity present in all spheres of economy and society and all organizations, of all types and sizes, at all levels. Management is focused on efficiency and effectiveness to rationally use the available human, financial and material resources to achieve organizational goals. Successful are those organizations that do the right things the right way.

No matter how different their roles are, managers at all levels perform four basic management functions: planning, organizing, leading, and controlling. Harmonious and synchronized action of these levels of management is necessary for the survival and development of the organization. Operational management is at a lower level in the hierarchy and has the task of implementing strategic management plans. So, we can say that operational management turns strategies into tangible tasks of production management, with the goal of improving the competitive position of the company. Production processes differ significantly in certain types of products and services, but what they all have in common is the transformation of inputs into outputs. Therefore, the role of operational management is to implement the transformation of inputs more efficiently into outputs, which should result in a quality product or service. Considering that the biggest business costs are incurred during the production process, ie. transformation of inputs into outputs, which means that it is the operational management that has the most room to reduce production costs. To this end, operational management defines the specific tasks and objectives of business functions and business units. For operational management to be successful, it must first provide the structure and quality of the necessary resources, and to direct and use them according to the desired goal. Schroeder (1999) linked the basic tasks of operational management to the following functions:

- quality
- process design
- capacity planning and scheduling
- inventory management
- Human Resource Management

Execution of jobs and tasks of one function is a prerequisite for the realization of others, and all functions individually are links in the chain of functioning of the company. In order for the company to maintain a competitive position, it is necessary that the operational activities are supported by the strategy and vice versa, ie. to permeate each other.

SPECIFICS OF OPERATIONAL PRODUCT MANAGEMENT IN THE SME SECTOR

Small and medium-sized enterprises generally find it easier to adapt to changes in supply and demand dictated by the market. In large companies, the organizational structure is rigid and formalized, while small companies usually have a simple organizational structure, with a small number of employees who perform multiple functions. This type of management is usually called entrepreneurial and differs significantly from managerial management. The most important role is, of course, played by the entrepreneur or founder, who performs all the most important tasks in the initial phase of development. It follows that a manager in a small company must master the techniques and skills to perform tasks that are performed by more managers in large companies, which at the same time means greater responsibility in making and implementing decisions. Due to the lack of resources in small enterprises, part of the work is usually entrusted to other entities and performed outside the enterprise itself (Stošić Mihajlović, Lj., 2022).

All the above leads us to the conclusion that the management of small business has its own specifics in relation to large companies, both strategically and operationally. An entrepreneur, unlike a manager, must know equally well the skills and techniques of both operational and strategic management. Problems usually arise when, due to accelerated growth and development, the scope of strategic and

operational work exceeds the capacity of one man-entrepreneur. Accelerated growth and development of companies is usually not accompanied by adequate growth and development of management knowledge and skills. An entrepreneur pressed by a bunch of strategic and operational issues that need to be addressed does not have the time for education that is constantly needed, both on a practical and theoretical level. The questions that need to be answered in operational management are mostly specific and immediate, while strategic management is focused on the long-term issue of the company's harmony with the environment. When resolving operational issues, the dominance of the urgent over the important is very often present. In such a situation, strategic neglect in relation to operational activities is most often neglected, which will bring the long-term company into crisis. A crisis can be avoided if the entrepreneur hires a manager and delegates part of his powers to him and other associates, which entrepreneurs are reluctant and rarely do. With the increase in the number of people engaged in the company, the number of hierarchical levels increases, and the organizational structure becomes more complicated, which of course increases business costs and inevitably requires the delegation of authority. In doing so, the entrepreneur becomes a manager who predominantly deals with strategic issues, while the operational entrusts to lower-level managers.

CONCLUSION

The importance and role of small business in the overall socio-economic development of every country, including Serbia, is indisputable. The business success of a small business largely depends on the knowledge and skills of management needed to make and implement business decisions. Small business management has its own specifics in relation to large companies, both strategically and operationally. Small businesses are better able to adapt to changes in supply and demand dictated by an increasingly turbulent market. Unlike large ones, in small companies, different managerial roles change and intertwine, and the owner in the form of an entrepreneur is both a strategist and an operative. To succeed, he needs different knowledge, competencies, and skills, as well as entrepreneurial spirit, creativity, and innovation. In the beginning, it is easier, but as the company grows and develops, it exceeds its capacities, because the accelerated growth and development of the company usually does not follow the appropriate growth and development of managerial knowledge and skills. To overcome the challenges and avoid the crisis, it is necessary to hire new managers at a lower hierarchical level who will deal with operational management issues. The further destiny and business success of the company in an increasingly competitive environment will depend on the adequate selection of staff and the delegation of authority.

REFERENCES

Chase, R.B., Jacobs, F.R., & Aquilano, N.J. (2004). *Operations Management for Competitive Advantage (10th ed.)*. McGraw-Hill/Irwin, Boston, 18-26.

Eurobarometer Team of the European Commission, (2007). *Observatory of European SMEs, Flash Eurobarometer*, No. 196, Budapest, European Comission.

Heizer, J., & Render, B. (2006). *Operations Management (8th ed.)*. Prentice Hall, New Jersey, 96-118.

Johnston, R., & Clark, G. (2008). *Service Operations Management (3rd ed.)*. Financial Times-Prentice Hall, Harlow, 96-111.

Mahmutović, H., & Kulović, Dž. (2010). *Upravljanje preduzećem*. Data status, Beograd. publikacije.stat.gov.rs/G2022/HtmlL/G20221023.html Date of access: 15.01.2022.

Schroeder, R,. G. (1999). *Upravljanje proizvodnjom: odlučivanje u funkciji proizvodnje*. Mate, Zagreb, 45-52.

Stošić Mihajlović, Lj. (2022). *Operativni proizvodni menadžment*. Akademija tehničko.vaspitačkih strukovnih studija, Niš, 62-63.

Symeonidis, G. (1996). Innovation, Firm Size, and Market Structure:Schumpeterian Hypotheses and Some New Themes. *OECD EconomicStudies, 27*, 35-70.

www.apr.gov.rs/.htmnewsId, Date of access: 23.01.2022.

www.srbija.gov.rs/vest/porast-registrovanih-privrednih-subjekata-u-2020-godini.php Date of access: 21.01.2022.

BLOCKCHAIN IN THE SUPPLY CHAIN

László Szabó
Budapest Business School, Faculty of Finance and Accountancy, Budapest, Hungary
E-mail: szabo.laszlo4@uni-bge.hu

ABSTRACT

Digital technology has transformed many aspects of our lives and brought significant change across industries. Blockchain technology has been the focus of much research in recent years. In logistics and supply chain, blockchain-centric solutions are being sought to perform infocommunications activities with distributed databases. Business users expect supply chains to leapfrog in efficiency and speed. This article introduces blockchain technology and provides insights into its areas of application for logistics.

Key words: Blockchain, Supply chain, Logistics, IoT.

INTRODUCTION

Digitalization started to transform the logistics industry in the late 1990s. The advent of artificial intelligence (AI) revolutionized business practices. With the Internet of Things (IoT), businesses can use real-time data to improve processes and reduce costs, making it a major player in the transport and logistics sector. The concept of the blockchain is also coming into focus, and not coincidentally, this technology can solve one of the biggest problems organizations face: securely managing information shared across networks.

THE BLOCKCHAIN

Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system. The blockchain is essentially a digital ledger of transactions that is replicated and distributed across the entire network of computer systems in the blockchain. Each block in the chain contains transactions, and each time a new transaction is made on the blockchain, an entry for that transaction is added to the ledger of all participants. A decentralized database managed by several participants is called distributed ledger technology (DLT). (A blockchain is a type of DLT in which transactions are recorded with an immutable cryptographic signature, called a hash.) This means that if a block in a chain were changed, it would immediately become obvious that it had been tampered with. If hackers wanted to tamper with a blockchain system, they would have to change every block in the chain, in all distributed versions of the chain. (euromoney.com, 2020)

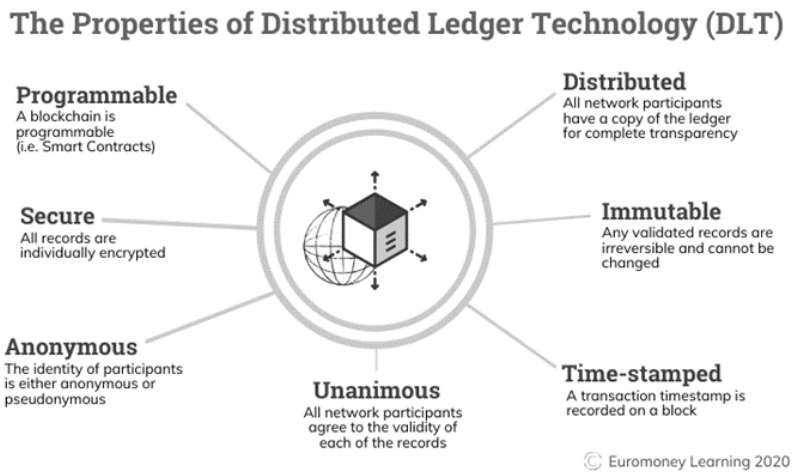


Figure 1: The Properties of Distributed Ledger Technology (DLT)
(euromoney.com, 2020)

THE BLOCKCHAIN TECHNOLOGY COLLABORATION AND PROCESS COMPLEXITY OF BLOCKCHAIN-BASED APPLICATIONS

Blockchain applications can be characterised along two basic dimensions that show the impact of using a blockchain-based decentralised platform on existing collaboration structures and processes: collaboration complexity and process complexity. As the technical features of the technology allow for distributed management of all types of transactions, there is no longer a need for a trusted party to authenticate transactions. This disintermediation not only leads to a "re-engineering" of processes, but also to a change in the participants in existing business structures. (Heines, 2021)

Cooperation Complexity

One of the difficulties of using blockchain-based decentralized platforms is often the peer-to-peer structure, which puts all participants on an equal footing. To implement such a platform, common business processes and activities must first be translated into programmable logic and replicated in a given blockchain technology stack. Thus, before launching a concrete blockchain network, different actors need to agree on, for example, a common platform and a specific protocol. (Heines, 2021)

Process Complexity

The smart contract function, i.e. the automatic execution of rules and instructions based on business logic stored in the blockchain, has huge potential for many companies. As the consistency of transaction data is improved through the tamper-proof storage of a replicated ledger, smart contracts enable the automatic execution of almost all upstream and downstream tasks. (Heines, 2021)

Based on these two dimensions, the following framework emerges with four dimensions: record keeping, automation, tokenization, and platforming (Heines, 2021):

Record Keeping
All posts on the open blockchain can be tracked by all network participants under a pseudonym. Each block consists of cryptographically sealed transaction data, which is more secure against manipulation.

Automation

Distributed ledger technology can not only address inefficiencies in data sharing, but can also lead to a paradigm shift in the automation of business interactions. Traditional business processes are based on siloed IT services managed within organisations and between business units.

Tokenization
Because data stored on a blockchain cannot be manipulated, it can also represent and store values such as access rights, ownership of goods or intangible assets with certain characteristics.

Platforming
The decentralisation and immutability of the blockchain, as well as the opportunities created by tokenisation and smart contracts, have the potential to challenge the business models of many organisations. Blockchain-based platforms are expected to transform existing financial market infrastructures, among other things.

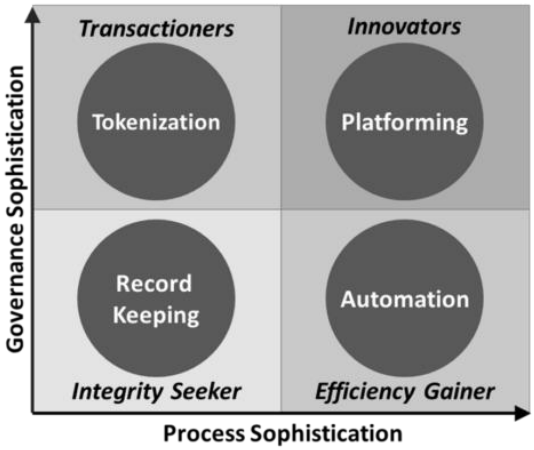


Figure 2: Framework for Classifying Blockchain-Based Applications
(Heines, 2021)

BLOCKCHAIN TECHNOLOGY FOR SUPPLY CHAINS

In today's supply chain hubs, most actors receive information - in paper or electronic form - only from the previous actor and, after further processing, pass it on to the next actor, often by re-recording the data. This repeated data entry leads to a high number of data integrity breaches and not infrequent data loss. With decentralised accounting of transactions, made possible by Blockchain, parties work into a common database, usually in the cloud, where each party has access to the data relevant to him/her according to his/her privileges. Thanks to the technology, the contents of the database are guaranteed to be the same, no matter how many copies exist. (IBCS Hungary, 2018)

IoT enables devices across the Internet to send data to private blockchain networks to create tamper-resistant records of shared transactions. Each transaction can be verified to prevent disputes and build trust among all permissioned network members. (IBM, 2022)

Major multinational companies have also recognised the potential of blockchain, such as Volvo and Coca Cola. The most significant benefits for both companies is the ability to trace the origin of raw materials and components. The use and traceability of raw materials of the right quality is also particularly important from a quality assurance point of view. The blockchain ensures that this data is widely accessible and at the same time immutable. (Árpási, 2020)

The benefits of the technology for supply chain actors are therefore:
- a transparent and credible data system,
- reduced costs,

- information freely available to stakeholders. (Árpási, 2020)

The practical benefits of blockchain in logistics:
- facilitates container location
- indicates the status of customs documents and waybills
- unifies operations and partners in the transport process
- allows you to improve your work
- reduced operating costs
- easier control
- fewer intermediaries
- limits the number of paper documents
- shorter delivery times. (tokeny.pl, 2019)

In addition to the obvious benefits, there are of course also difficulties and limitations. Whilst traceability and thus accountability for quality performance is a good thing for the end user, for example, it is unlikely to be a benefit for all stakeholders. The rooting of a new system is always complicated because it requires the agreement and integration of all stakeholders. Training and education can be organized for both external and internal stakeholders, which takes time and resources. (Árpási, 2020)

CONCLUSION

Once considered an oddity, blockchain technology has now become a more widely used process, found in all areas of the economy.

Globally, organizations have been taking advantage of blockchain technology to improve traceability in their supply chain. (Vyas et al., 2109) However, there are also problems that are slowing the rapid spread of blockchain. Some are concerned about cyber security and regulatory complications. (Móray, 2020) However, it is safe to say that in the near future, the use of blockchain technologies in supply chains will continue to grow because of the benefits it brings.

REFERENCES

Árpási, Z. (2020). Blokklánc a gyakorlatban: logisztika, ellátási lánc. Retrieved from https://cryptofalka.hu/blokklanc-logisztika/

euromoney.com (2020). What is blockchain? Retrieved from https://www.euromoney.com/learning/blockchain-explained/what-is-blockchain

IBCS Hungary (2018). Blockchain a logisztikában. Retrieved from https://ibcs.hu/hirek/blockchain-a-logisztikaban/

Heines, R. (2021). Classification of Blockchain-Based Applications: A Conceptualization from a User Perspective Retrieved from https://ccecosystems.news/en/classification-of-blockchain-based-applications-a-conceptualization-from-a-user-perspective/

IBM (2022). How does IoT work with blockchain? Retrieved from https://www.ibm.com/topics/blockchain-iot

McKinsey & Company (2017). Blockchain technology for supply chains—A must or a maybe? Retrieved from https://www.mckinsey.com/business-functions/operations/our-insights/blockchain-technology-for-supply-chainsa-must-or-a-maybe

Móray, G. (2020). Mi az a blokklánc technológia és milyen lehetőségeket kínál? Retrieved from https://computerworld.hu/tech/mi-az-a-blokklanc-technologia-es-milyen-lehetosegeket-kinal-285890.html

tokeny.pl (2019). Blockchain a logisztikában. Retrieved from https://tokeny.pl/hu/blockchain-a-logisztik%C3%A1ban/

Vyas, N., Beije, A., & Krishnamachari, B. (2019). *Blockchain and supply chain*. Croydon (UK), Kogan Page.

INFLUENCE OF QUALITY MANAGERS ON ORGANIZATION QUALITY PERFORMANCES

Dijana Tadić
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia
E-mail: dijana.tadic@tfzr.rs

ABSTRACT

The leadership of modern business organizations need a new vision of the world and a new framework for behavior in it - for the changes that are constantly happening. Significant conceptual change of business is brought about by Industry 5.0. Because they have to manage in times of great turbulence, executives need a system for making better decisions, in different areas of business. The key to the setting of the paper is the emphasis on the quality manager, which is expected to contribute to the concept of quality of the future - the concept of 5.0. The aim is therefore to establish the basic elements of the theoretical model of the examined relationship between the characteristics of quality managers and their impact on the performance of the organization - the efficiency of introducing the highest point of quality and possible quality outcomes that different quality management can cause.

Key words: Quality 5.0, Industry 5.0, Quality manager, Characteristics.

INTRODUCTION

From the 18th century onwards, there were industrial revolutions that, each in its own way, shaped the world. In the 21st century, production is characterized by cyber-physical systems, information and communication technologies, automation, artificial intelligence, robotics and many other technologies. Their integration enables the realization of the highest form of quality, which is also called Quality 5.0. Quality 5.0 managers must possess certain characteristics, but also knowledge, in order to contribute to increasing the quality performance of the organization.

This paper is based on a theoretical model, how the characteristics of managers affect the efficiency of the introduction of Quality 5.0. Some of the possible outcomes, to which different management contributes, are also presented. Through further research, based on this model, it will be possible to discover exactly what qualities, qualifications and knowledge it is desirable to have a quality manager in Industry 5.0. This will contribute to making more correct decisions when hiring a quality manager, which will result in a more successful and faster implementation of the quality concept of the future.

CHARACTERISTICS OF QUALITY MANAGER 5.0

Every manager must possess moral qualities, intellectual abilities, physical qualities and knowledge and experience in the jobs he manages (Bojić, 2018). This refers to the developed social awareness and responsibility that the manager takes on; realism, objectivity and the ability to persuade; physical and mental health; general and vocational education.

It is not news that they are successful leaders and leaders, both physically and spiritually. There is an opinion that leaders are not appointed, elected or appointed, they stand out with their characteristics, which make them leaders (Tomić & Glavač, 2019). In order for a quality manager in Industry 5.0 to be successful, he must possess the qualities of a leader.

The main characteristic of a leader is innovation (Buhač, 2020). Today's production takes place through the cooperation of people and machines (Bharati, 2021), which results in greater creativity and efficiency in production processes (Nahavandi, 2019). It can be said that the production flow is taking place in an innovative way, compared to a few years ago, so a more innovative approach is expected from the manager, more than ever before.

The human factor in production is crucial when it comes to product innovation and personalization (Doyle-Kent & Kopacek, 2019), and Quality 5.0 strives for uniqueness and originality, which is made possible by the aforementioned industrial revolution. The quality manager, therefore, must possess traits such as: courage, flexibility, creativity, imagination, passion and drive to initiate change, to realize the full potential of the many technological capabilities available to man, in order to introduce and maintain Quality 5.0, and thus improve performance the quality of the whole organization.

Unlike previous revolutions, the human factor is at the center of all events (Kurniawan et al., 2019). With the complete automation of production, the demand for human touch in the production process is growing, with which customers emphasize their personality (Østergaard, 2018). It is believed that modern technology will enable personalized production in the Fifth Industrial Revolution, but that market demands will require greater human participation (Javaid & Haleem, 2020). Quality managers must have adequate access to their team members, but also to other employees, in order to motivate and inspire them to strive for better quality of the entire organization, but also to strive to propose new ideas to achieve market success. In addition to intuition when assessing which team member will perform the best task, it is also necessary to encourage the activity, and transfer personal will to it (Nadoveza & Pešić, 2020). In this regard, Austin and Williams (2021) believe that every leader should have the strength of will, a sense of proportion and tact, to be resilient and loyal to his work group, as well as to have deep faith in people.

In addition to the above characteristics, quality managers must have a wide range of knowledge about modern technologies and their capabilities. Today, technology is integrated into every aspect of human life (Prastowo et al., 2020). Awareness of technological advances and a willingness to change business habits, as well as the ability to help other employees more easily embrace innovation, will contribute to a faster and easier introduction of Quality 5.0 into the organization.

Those managers who deliberately strive for achievement are said to be conscientious (Sokić et al., 2019). Such people are adorned with qualities such as diligence, determination, caution and reliability. By their example, they show others what conscientious business should look like, and what values the organization is focused on. This feature is highly desirable for quality managers. The quality has always had to be approached conscientiously, and the increasingly demanding market insists on an even deeper and more thorough approach.

Table 1: Managerial characteristics that make him ideal

	SAD	**Belgium**	**Northern France**	**Eastern France**
Nervous and physical energy	1	8	9	9
Consistency, audacity	2	5	1	1
Delight	3	3	5	5
Understanding people	4	6	4	4
Integrity	5	2	2	5
Mastery in techniques	6	10	8	7
Character strength	7	7	7	8
Intelligence	8	4	5	2
Pedagogical sense	9	9	10	10
Instilling confidence	10	1	3	3

Source: (Cambrea et al., 2021)

According to one study, which covered several countries (Cambrea et al., 2021), the characteristics of managers were assessed, which are considered desirable. Table 1 shows the grades given by managers, and they assessed the characteristics that make up a top manager.

QUALITY MANAGER 5.0 AND ORGANIZATION QUALITY PERFORMANCE

Industry 5.0, in addition to many technologies, has brought with it inexhaustible opportunities that can be used to develop the quality and performance of the organization globally. The quality manager with his knowledge and understanding of changes in the technological sense, as well as the way of doing business, can contribute to improving the quality performance of the organization.

In the previous industrial revolution, the human factor in production facilities was reduced to a minimum. For this reason, despite the incredible technology and the possibility of mass customization, highly sophisticated customer requirements could not be fully met (Østergaard, 2018). Today's customers want products that will stand out, and that no one has had before (Mascarenhas et al., 2004), ie that have the personal mark of craftsmen and designers, making something unique (Ozkeser, 2018). The Quality 5.0 Manager, in addition to making sure that the products look perfect, that they are functional, made of materials that do not harm the environment and more, must think in the direction of how to make products unique and attractive to customers in the market. By taking actions to create such products, the quality performance of the organization will increase and thus, make a profit.

Knowing that many jobs, which have so far required hard human work, intense concentration and spending some time, with the help of modern technology, can be done in a much faster, more practical and reliable way, says quality manager based on changes in the organization. will contribute to a different distribution of energy: robots will perform physical tasks, artificial intelligence will collect and analyze data, sensors will stop production due to poor quality, and people will engage in creative work and devise ways to provide more efficient personalized production. ideas that could not have been imagined before, and today there are all the conditions for their realization.

Quality management is directly related to the performance of the organization. In addition to top management, which makes the most important decisions related to the organization, quality managers make sure that the products or services that the organization places on the market, have characteristics that will cause positive reactions from customers. It is necessary to react quickly, with machine precision and properties of products that only the human mind can create.

QUALITY MANAGEMENT 5.0 AND POSSIBLE OUTCOMES

In order for an organization to introduce Quality 5.0, it is first necessary to design and develop a plan, ie the course in which the introduction will take place. The knowledge possessed by the quality manager, his inspiration, motivation and desire to achieve high results will influence the setting of the plan. Given the large number of innovations and changes in recent years, the quality manager will meet with many unknown segments, which will further aggravate the situation.

It is very important to stay consistent with the plan, and for everyone to stick to it. This requires actions such as explaining how, why and how something should be done. Special attention must be paid to those who do not easily accept change, and create riots among employees. Very often, the cause of such behavior is a lack of understanding of the essence, fear of the unknown, or fear of losing influence or a job. If such obstacles are not eliminated in time, there may be a decrease in faith in the correctness of the plan among other employees, and there will be no improvement.

If the quality manager is afraid of change and is afraid of technological innovations, the improvement and introduction of Quality 5.0 will not happen. Negative effects that a quality manager can cause with his inadequate management, can be manifested even after the introduction of Quality 5.0. Which

further poses a threat that the achieved success will be nullified or the achieved results will be set back.

Assessment of the qualities and characteristics of a quality manager can be determined very quickly and efficiently using various personality tests; but it takes a little more time to manage. If a new manager has taken a position, it takes some time to get acquainted with everything that makes up that organization, and then to determine how he manages and how his behavior manifests itself to other employees.

Possible outcomes of quality management can vary from very positive to those that do not lead to the introduction of Quality 5.0. The worst possible outcome is not noticing the existence of a certain problem, or attributing bad outcomes to something else. In such cases, it is very likely that it will be too late to find out where the focus of the disturbance is.

GUIDELINES FOR FURTHER RESEARCH

The first condition for a quality manager to achieve noticeably positive results on the performance of the organization, is to possess leadership qualities. Regardless of the wide range of knowledge he may have about Quality 5.0, if he does not know how to pass it on to his associates, motivate them, move them into action and create a spirit of community with the idea that they can do it, no effort will be made. to bear fruit.

It is also necessary to establish what motivates such a quality manager. In addition to the innate, or learned ability to lead others, the leader must be motivated to make every effort to achieve the goal. Only motivated, he will motivate other employees. The introduction of Quality 5.0 is a complex mission, which requires the participation of all employees.

In addition to qualities and motivation, the ability to handle modern technologies is necessary. Inevitably, the technologies that marked the Fourth Industrial Revolution will continue to be used and upgraded over time in Industry 5.0. According to research conducted by Efimova and Brish (2021), the impact of technologies such as Big Data and Big Data analytics has contributed to transparency, credibility, forecasting and data control, enabling more efficient quality management (Chiarini, 2020; Zonnenshain & Kenett, 2020). In the future, an increase in the number of available data can be expected, which will be analyzed by technological processing and provide an opportunity for quality managers to improve their quality tools and improve the quality performance of the organization. Therefore, the adaptation and application of these technological possibilities in production is essential.

In addition to the above, technologies that make a great contribution to quality management are simulations and artificial intelligence (Efimova & Brish, 2021). Their application is a wise choice in terms of the support necessary for successful quality management. The quality performance of organizations directly depends (and this trend will continue in the future) on the decisions made by managers, and those on the application of various types of technologies. Investing in upgrading existing and purchasing other modern technologies is the key to the success of any company.

CONCLUSION

The managerial skills of a manager dictate the success of any organization. His characteristics, competencies and motivation are one of the key factors for the introduction and maintenance of top quality in the organization.

The technologies that marked Industry 4.0 are an indispensable segment in the introduction of Quality 5.0. Even more frequent and widespread use of technological possibilities can be expected, with the constant development of their capabilities. With a larger number of data, their processing and analysis,

quality managers will make safer and better strategic decisions regarding the achievement of long-term quality.

It can be said that the manager of Quality 5.0, represents a bridge between modern technologies and the performance of the organization. The application of various technological possibilities provides knowledge, the management of which will increase the possibilities of creating high results.

REFERENCES

Austin, A. A., Williams, L. T. (2021). Evaluating company adoptions of blockchain technology: How do management and auditor communications affect nonprofessional investor judgments? *Journal of Accounting and Public Policy* 40(5): 106882,

Bharati, S. (2021). Business intelligence and Industry 5.0. *Journal of the International Academy for Case Studies*, *27*, 1-3.

Bojić, M. (2018). *Uticaj menadžera na kvalitet poslovanja organizacije*. Univerzitet Privredna akademija u Novom Sadu.

Buhač, I. (2020). *Razvijanju liderskih sposobnosti zaposlenika* (Doctoral dissertation, Josip Juraj Strossmayer University of Osijek. Faculty of Economics in Osijek. Chair of Management, Organization and Entrepreneurship).

Cambrea, D.R., Ponomareva, Y., Pittino, D., Minichilli, A. (2021). Strings attached: Socioemotional wealth mixed gambles in the cash management choices of family firms. *Journal of Family Business Strategy*, 100466.

Chiarini, A. (2020). Industry 4.0, quality management and TQM world. A systematic literature review and a proposed agenda for further research. *The TQM Journal*, *32*(4), 603-616.

Doyle-Kent, M., & Kopacek, P. (2019, August). Industry 5.0: Is the manufacturing industry on the cusp of a new revolution?. In *Proceedings of the International Symposium for Production Research 2019* (pp. 432-441). Springer, Cham.

Efimova, A., & Briš, P. (2021). Quality 4.0 for processes and customers. *Quality Innovation Prosperity*.

Javaid, M., & Haleem, A. (2020). Critical components of Industry 5.0 towards a successful adoption in the field of manufacturing. *Journal of Industrial Integration and Management*, *5*(03), 327-348.

Kurniawan, A., Komara, B. D., & Setiawan, H. C. B. (2019). Preparation and Challenges of Industry 5.0 for Small and Medium Enterprises in Indonesia. *Muhammadiyah International Journal of Economics and Business*, *2*(2), 155-160.

Mascarenhas, O. A., Kesavan, R., & Bernacchi, M. (2004). Customer value-chain involvement for co-creating customer delight. *Journal of Consumer Marketing*.

Mekkunnel, F. (2019). *Industry 5.0: man-machine revolution* (Doctoral dissertation, Wien).

Nadoveza, B., & H. Pešić. (2020). Održivi razvoj - proizvodna snaga savremenog društva. *Održivi razvoj 2*(1), 31-40.

Nahavandi, S. (2019). Industry 5.0 - A human-centric solution. *Sustainability*, *11*(16), 4371.

Østergaard, E. H. (2018). Welcome to industry 5.0. *Retrieved on February*, *5*, 2020.

Ozkeser, B. (2018). Lean innovation approach in Industry 5.0. *The Eurasia Proceedings of Science Technology Engineering and Mathematics*, (2), 422-428.

Paschek, D., Mocan, A., & Draghici, A. (2019, May). Industry 5.0 - The expected impact of next Industrial Revolution. In *Thriving on Future Education, Industry, Business, and Society, Proceedings of the MakeLearn and TIIM International Conference, Piran, Slovenia* (pp. 15-17).

Prastowo, A. I., Firman, A. J., Mulyanto, T., & Wiranata, R. R. S. (2020, September). The Independent Learning Curriculum Concept of Imam Zarkasyi's Perspective In Pesantren For Facing The Era of Society 5.0. In Proceedings of the *4th International Conference on Learning Innovation and Quality Education* (pp. 1-6).

Sokić, K., Gutić Martinčić, S. & Bakić, M. (2019). Uloga ličnosti u organizacijskom ponašanju. *FIP – Financije i pravo*, 7(2), 23–50.

Tomić, Z. & Glavač, K. (2019). Političko vodstvo. *South Eastern European Journal of Communication, 1*(1), 9–20.

Zonnenshain, A., & Kenett, R. S. (2020). Quality 4.0 — the challenging future of quality engineering. *Quality Engineering*, *32*(4), 614-626.

Session B: HUMAN RESOURCE MANAGEMENT

Papers (pp. 136-168):

OVERVIEW OF STUDIES RELATED TO THE IMPACT OF STRESS ON EMPLOYEE PRODUCTIVITY AND STRESS MANAGEMENT IN COMPANIES

Verica Gluvakov
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia
E-mail: vekagluvakov@gmail.com
Sanja Stanisavljev
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia
Dragana Milosavljev
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia
Mila Kavalić
University of Technical Sciences, Novi Sad, Serbia
Maja Gaborov
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia

ABSTRACT

This paper has aim to show the most significant causes of stress among employees as well as its impact on them and the business itself. The conclusions were made on the basis of previously conducted research in different companies. Different authors tried to answer the questions about stress and stress management among employees using different research methods, and this paper will consider previously conducted research in order to present what they all have in common. The conclusions of the paper will focus on stress and its effects in business environment.

Key words: Stress management, Employee productivity, Business.

INTRODUCTION

Stress can be defined as a human response in the form of physiological, psychological or behavioral deviations in response to an extreme situation. The term stress does not include an individual's fear, nervous tension or something that must be avoided. Stress can be defined as the mental and physical effort that an individual feels as a result of environmental factors and needs to be studied for several reasons. One of the reasons is that stress can cause a psychological disorder in a person as well as psychological consequences on his health. Another reason to study the question of stress is that employee stress is a common cause of employee absenteeism. Also, the reason for studying stress is that there is a possibility of transferring stress to other employees in the business environment (Sajfert, 2008). The concept of stress at work can be defined as the result of inadequate demands of the work environment and the capabilities of employees, and can occur not only as a result of pressure from the work environment, but also as an expression of general imbalance between work situation characteristics and individual characteristic. Stress at work can be the cause of certain diseases, less motivation of employees, less productivity and less self-confidence in their own working abilities at work (Juras, 2009). One of the most common causes of stress at work are organizational changes that cause resistance among employees. However, in addition to this, there are several other causes of stress at work (Popov, 2018):

- Content of the work itself – uniformity of tasks and lack of dynamics.
- Amount of work – too much or too little work and time-limited work.
- Working hours – inflexible working hours and overtime stay at work.
- Lack of career advancement, position and earnings – job insecurity, low chances of advancement, lack of expertise and unfair performance rewards.

- Interpersonal relationships – bad relationship with co-workers, loneliness and non-acceptance of workers problems.
- Organizational culture – poor communication, poor leadership and unclear goals.
- Work-life balance – lack of understanding of house problem at work and vice versa.

Understanding stress and its impact on employee performance is the first phase in stress management, where the manager needs to find out what is the relationship between the amount of stress and the amount of employee performance.

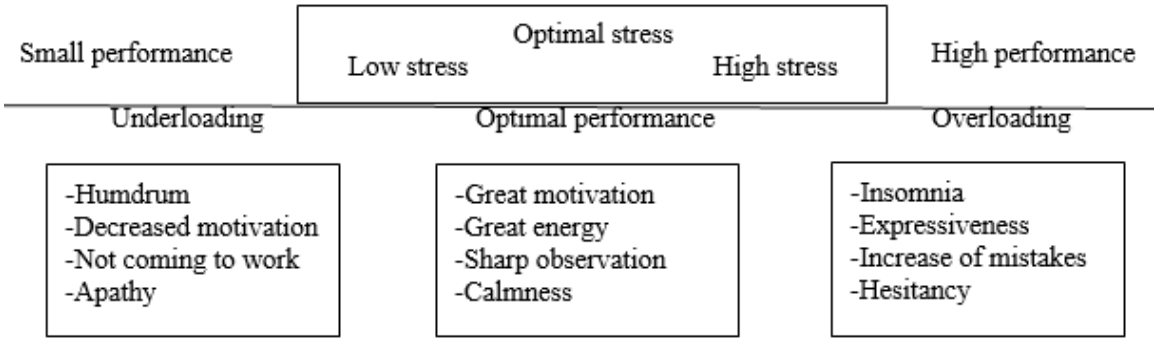


Figure 1: The relationship between stress level and performance level
Source: Ivancevich et al., 2014, p. 237.

The picture shows that stress can be low, optimal and high, so that low or high stress corresponds with low or high performance, while the performance of employees is on highest level in medium and optimal stress. According to this, those individuals who feel optimal stress contribute to increased performance, unlike others who feel extremely high or low stress, which has the effect of reducing work performance. Identifying where there is stress in the organization is the second phase of stress management. When it is precisely determined where stress exists, then it must be determined whether the stress is at the appropriate level or whether it is high or low. Low stress can be increased to the desired level by different psychological actions in contrast of high stress which can be reduced by subtle methods on employees. The most difficult task for managers is to identify or recognize employees who feel high level of stress. Identification of employees who feel high level stress can be based on symptoms such as high blood pressure, mood swings and constant anxiety. Helping employees to control or manage stress is the third phase in stress management. Factors that lead to human stress are called stressors and in organizational environment, stressors can be tasks, level of job complexity, level of responsibility, technology changes, organizational culture as well as other employees (Ivancevich, 2014).

METHODOLOGY

The subject and The problem of Research

This paper will deal with considering the most common causes of stress in business environment, the impact of stress on employees and business operations as well as determining ways to reduce and manage stress in the organization. This paper won't be focusing on specific aspect, rather try to observe as many different studies as possible.

Research Goals

The main goal of this overview of studies is to determine the impact of stress on employees and their productivity in companies, as well as presenting the causes of organizational stress. This paper also aims to present some of the ways to reduce or eliminate stress in organization.

Research Question

Based on analyzed theories I will try to answer the following questions:
1. Which are the most common causes of stress in business environment?
2. How does organizational stress affect employees?
3. Which are the ways to manage organizational stress?

Research Method

This is a form of theoretical research in which conclusions are based on previous researches and their comparison with one another. Research will consider different methodologies of other authors as well as analyze results and compare them in hope of reaching universal conclusions.

RESULTS AND DISCUSSION

The first reviewed study aimed to discover the causes and intensity of stress among employees and advice on preventive and corrective measures. The research was conducted in the company at the level of organizational units. In the first phase of this research, a team of psychologists interviewed employees based on which a questionnarie was made that contained 78 questions about specific situations at work as well as 10 additional questions about life situations that can be significant stressors. The answers in the qustionnarie were classified with grades from 1 do 5, and the average grade of 3,5 or more was taken as the criterion of analysis. Questionnaries were delivered to each organizational unit in aim to divide stressors into groups, and 51,16% of all employees participated in this research, more precisely 664 persons. The analysis of the results identified seven groups of stressors in the organization: work overload, poor management, problems in performing tasks, poor working conditions, fear and insecurity, problems withs colleagues and poor conditions in the restaurant. All groups of stressors were assesed by employees as very important for doing work and as significant sources of stress. In the mentioned groups of stressors, highest grades of presence has the factor of poor working conditions (2,95), followed by poor condition in the restaurant (2,89) and work overload (2,87). The lowest grades have fear and insecurity (2,08) and problems with colleagues (2,03). All grades are bellow 3,00 which indicates that at the company level no group of stressors is expressed above average specifically in this research. The most common causes of stress that are common to all categories of stressors are urgency of work, short deadlines and constant learning of new things. Employees estimate that stressors outside the organization increase overall stressors from 2% for stressors caused by poor working conditions to 22% for stressors caused by fear and insecurity. According to this, employees come to work tense, so they misjudge management, relationship with colleagues and performing they own work (Lipnjak, 2011).

Another study shows some of the most common causes of stress in business. This research was conducted in production organization. The research sample was consisted of 60 employees and, after receiving the instructions for work, respodents filled out the questionnarie. Both sexes of different ages who work in the organization for a certain period of time at their workplace were interviewed. The questionnarie consisted of two parts. The first, general, part of the questionnarie referd to demographic characteristics such as gender, age, years of service and education. The second part of the questionnarie consisted of 30 statements which represented stressful events in business environment. Stressful situations were examined through lack of support from superiors, non-job duties, lack of opportunities for advancement, non-participation in task planning, poor employee motivation and poor working conditions. The company conducted research on stressful events in the workplace which are related to professional styles. According to this study, the most common causes of stress in production organization are lack of opportunities for advancement, obtaining new or unknown tasks, not receiving recognition for quality work, inadequate earnings and work with poorly motivated colleagues (Vračar, 2020).

The question of stress at work is closely related to employee productivity, and this study presents how stress affects employees and their work performance. The research was conducted on a sample of 270 employees in tobacco factory. The survey included 69% of male and 31% of female working population aged 20 to 65 years with different levels of education. This research aimed to determine the presence, level and sources of stress at work as well as their impact on health, absenteeism, quality of life and working ability of employees based on subjective perception. The presence of elements of stress at work was determined in 51% of interviewed employees, as well as the connection between stress and work ability and quality of life. The elements of stress at work were subjectively perceived by a larger number (83%) of employees with poor working ability and poor quality of life. It was also determined that employees under stress used a larger number of sick days and had more verified diagnoses compared to other employees. The conducted research came to the conclusion that there is a significant connection between stress and the more frequent occurence of absenteeism, which directly affects the reduction of employee productivity and the productivity of organization in general. Stress is present in all business structures and the elements of stress in the workplace are work organization and financial issues, work responsibility and professional requirements of the workplace which is the basis for creating activities to improve mental health and psychosocial work environment (Ećimović, 2016).

Few years ago, work related stress has become the second most commonly reported work related health problem in the UK and Europe. Several decades of stress research and studying with different techniques and methods have shown that stress has consequences for employees from an individual and organizational point. Different researches have demonstrated that certain job characteristics can be causes of organizational stress, but individual employee characteristic such as personality and coping behaviour are also important because employee vulnerability to stress is increased that way (Kelloway, 2008). According to all the above, responsibilities of employers are to assess physical and psychosocial hazards to health in the workplace and to take steps adress these by focusing on key areas such as demands, control, support, relationships, roles and change. There can be a form of changing the nature of the job or the work environment to make it less stressful by introducing primary level interventions such as job redesign an cultural change, by changing the attitudes and behaviours of employees through secondary level interventions such as stress management training and health promotion programs or by tertiary level interventions to provide support for the recovery of distressed employees such as employee counseling. For example, researchers have found that the primary level interventions designed to improve communication and consultation in a Dutch construction company resulted in a 30% reduction of absenteeism. Primary level interventios are very effective, however, studies found that in practice most interventions are individually focused and directed at increasing the responsibility of employees to take better care of their health and to manage stress more effectively. More precisely, most of the employers are using forms of stress management programs focused on encouraging individuals to exercise more control over their health and to increase their physical and psychosocial resistance to stress (Cartwright, 2014). Another study shows that in the fiels of stress managing the role of cultural differences must be considered. For example, social support is critical for some individuals, but individuals of different cultures may need other types of support, such as financial help. Appreciating the role of a specific cultural framework is essential for counselors who attempt to provide effective help to employees of various cultures (Chu-Lien Chao, 2011).

CONCLUSION

Taking in consideration all previously mentioned researches and paper works following conclusions were made. The most common cause of stress in business environment and among employees are poor working conditions. Other important causes that affect employees are obtaining new or unknown tasks, not receiving recognition for quality work and inadequate earnings (RQ:1). What is also concluded is that stress among employees can greatly affect their productivity, because the fact that employees who are under stress are often absent from work and have lack of work motivation, which directly reduces their productivity as well as the productivity of the company in general (RQ:2). Organizational stress can be managed and controlled in a several ways that are proven as effective

such as modifying or changing organizational culture of the company, prioritizing employees and monitoring their behaviour as well as various health improvement and stress control programs (RQ:3). The issue of stress in organizations and its impact on employees is an issue that needs to be studied even more in the future in order to prevent the negative consequences of stress on both people and business.

REFERENCES

Cartwrignht, S. & Cooper, C. L. (2014). Towards Organizational Health: Stress, Positive Organizational Behaviour and Employee Well-Being. *Bridging Occupational, Organizational and Public Health.* pp 29-42.

Chu-Lien Chao, R. (2011). Managing Stress and Maintaining Well-Being: Social Support, Problem-Focused Coping and Avoidant Coping. *Journal of Counseling & Development 83(3).* pp 338-348.

Ećimović, I. (2016). Učestalost elemenata stresa na radnom mestu. *Rauche zdravstveni časopis* (7). ISSN 2303-6907.

Ivancevich, J.M., Konopaske, R. & Matteson, M.T. (2014). *Organizational behaviour and management*. New York: McGraw-Hill Irwin.

Juras, K., Knežević, B., Golubić, R., Milošević, M. & Mustajbegović, J. (2009). Stres na radu: Mere prepoznavanja, rešenja i prevencija. *Sigurnost 51(2).* pp 121-126.

Kelloway, E.K., Hurrell, J.J. & Day, A. (2008). Workplace interventions for occupational stress. *The individual in the changing working life. Cambridge University Press.* pp 419-441.

Lipnjak, G. (2011). Istraživanje uzroka stresa zaposlenih. *Sigurnost 53(3).* pp 219-226.

Popov, B. (2018). *Stres u radnom okruženju*. Novi Sad: Univezitet u Novom Sadu, Filozofski fakultet.

Sajfert, Z. (2008). *Upravljanje promenama*. Zrenjanin: Univerzitet u Novom Sadu, Tehnički fakultet „Mihajlo Pupin“.

Vračar, A. (2020). Uticaj stresa na radne stilove u organizaciji. *Novi Sad: Zbornik radova Fakulteta tehničkih nauka.*

OVERVIEW OF STUDIES REGARDING THE IMPACT OF EMPLOYEE MOTIVATION ON WORK PERFORMANCE

Verica Gluvakov
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, **Serbia**
E-mail: vekagluvakov@gmail.com
Edit Terek Stojanović
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia
Sanja Stanisavljev
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia
Dragana Milosavljev
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia
Mila Kavalić
Faculty of Technical Sciences, Novi Sad, Serbia

ABSTRACT

This paper has aim to define the concept of employee motivation as well as the impact of employee motivation on their work performance and the performance of the company in general. Also, the aim of this paper is to find an answer to the question of the importance of employee motivation in the field of business. The paper will contain a review of different studies by different authors in order to make conclusions. The analysis of various conducted researches will lead to universal conclusions which will be presented in the paper.

Key words: Motivation, Employees, Work performance.

INTRODUCTION

The process of initiating activities in order to achieve certain goals, direct activities to certain facilities and regulate the way in which they will act is called motivation. Those internal factors that drive the activity which manage it in order to achieve certain goals are called motives. Motives are organic and psychological factors that move or direct a person's behavior, both his actions and his perception, learning and thinking. The source of motivation are needs that can also be organic and psychological. Needs in the case of motivation are defined as the lack of something (Rot, 1971). Motivation is a general term that refers to a whole set of urges, demands, needs, desires and similar forces. It can be said that managers motivate their employees so that they do tasks that they hope will satisfy the urges and demands of employees and encourage them to behave in a desirable way. Motivation can be seen as a chain reaction: the needs we feel lead to desires or goals that we strive for, which creates tension that strives to achieve goals, which ultimately creates satisfaction. Human motives are based on needs, either conscious or subconscious. Some needs are primary such as physiological needs for water, air, food and sleep. Other needs such as the need for self-esteem, status of connection with others, achievement and self-expression can be considered secondary (Sajfert, 2009). Motivators are things that motivate an individual to act. Although motivators reflect desires, they are certain rewards or incentives that increase desires in order to satisfy them. What managers need to do is to awake those motivators in people that will lead them to do work successfully for the company that employs them. The difference between motivation and satisfaction is that motivation refers to the aspiration and effort to satisfy desires or goals, while satisfaction refers to the fulfillment we feel due to the satisfaction of desire. In other words, motivation implies striving for a result while satisfaction is a consequence of that result. The issue of employee motivation is one of the issues related to business management, which has been studied more and more in the last few years and is gaining more and more importance. The current concepts of motivational systems, motivational techniques and strategies are becoming insufficiently flexible, so it is necessary to develop and introduce new ones, which with their

elaboration and versatility will lead to high motivation and employee satisfaction as well as achieve successful business (Ridgeway, 1982). In order to operate successfully, every company must find the optimal combination of tangible and intangible factors for its employees which will depend on numerous factors: the sector in which company operates, competition in the labor market, the nature of work and employee structure. The importance of work motivation grows with the need to organize more efficient and quality work engagement. Motivation is a very common subject of interest for scientists and practitioners, primarily because of its great utilitarian value. There is almost no job, activity, profession or other human activity for which motivation is not relevant and often a key problem (Mihailović, 2010). The work performance of employees, managers and the overall performance of the organization derive from the triangle shown in the Figure 1, which is based on:

- Working conditions and opportunities
- Abilities, knowledge and skills
- Motivation.

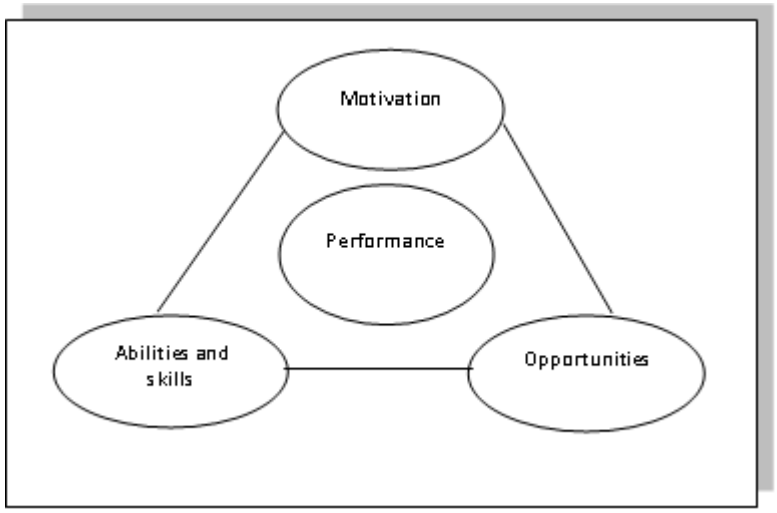


Figure 1: The importance of motivation
Source: https://www.link-elearning.com/site/kursevi/lekcija/6177

METHODOLOGY

The subject and The problem of Research

This paper will deal with considering the importance of motivation in the workplace as well as the impact of motivation on the organizational performance. Also, this paper will present the motivational factors that affect employee performance. This paper won't be focusing on specific aspect, rather try to observe as many different studies as possible.

Research Goals

The main goal of this paper is to present the most common motivating factors on employees and their impact on company performance. Also, the aim of this paper is to present the importance of motivating employees in the organization.

Research Question

Based on analyzed theories I will try to answer the following questions:

1. Which are the most significant factors of employee motivation?
2. How does employee motivation affect work performance?
3. What are the consequences of inadequate application of motivational techniques in the organization?

Research Method

This is a form of theoretical research in which conclusions are made by studying previous conducted researches. Research will consider different methodologies of other authors and analyze their results in order to make universal conclusions.

RESULTS AND DISCUSSION

The first study shows that a fair reward system provides employees with greater motivation and stronger incentives to complete tasks, and for the organization this means the ability to attract and retain people with appropriate skills and abilities. The reward system consists of tangible and intangible compensations and, according to this study, intangible rewards as a motivation factor represent an approach to increasing employee motivation by meeting their non-cash needs. Among the most commonly used are job design, management style, employee participation in decision making, flexible working hours and various types of recognition. For example, research conducted in the United States has shown that flexible working hours are becoming an imperative for modern organizations and, according to the data obtained, more than a quarter of full-time employees in the United States use flexible work schedules. When it comes to the European Union, there are significant differences between member states and the distinct application of this motivational technique is in Denmark, Germany, Finland and Norway, where more than half of employees use some form of flexibility in their working hours. The application of this motivating factor contributes to the productivity of employees, general satisfaction and better organization of work, as well as reducing delays and absences from work. However, the disadvantage of flexible working hours is that they cannot be applied to every workplace. It is mainly applicable for professional and managerial jobs (Vidaković, 2012).

Another study shows that material motivation is one of the fundamental factors on which the organizational practice of motivating employees is based. Salary and other material compensations are visible mechanisms of motivation and evaluation of work within the policy and practice of each company. It is important to know that there must be a connection between work results and rewards and that the reward system must be based on the positive consequences of work behavior. Material rewards value the creative potential of employees because it affects the improvement of business results (Buntak, 2013). The following study combines the impact of tangible and intangible factors on employees and shows their importance in business. A structured questionnaire was sent to 320 respodents from different companies in order to assess the importance of tangible and intangible factors of motivation. The study included a total of 21 rural and urban municipalities of Kosovo territory. The results of this research show that about 53% of employees consider salary as a very important factor of motivation, 39% of employees consider it important, while 3,4% think it is less important. From the presented results, 43% of employees think that continuous training is very important, 44% find it important and 5% think it is less important. Also, 46% of employees think that the ease of promotion in their career is very important, 40% find it important and 4% think it is less important. This study shows that the salary of workers, professional advancement and the opportunity for promotion appear to be the most important factors of motivation. The other important factors that the study revealed are work conditions as well as the evaluation and the objective assessment of performance measurement (Ismajli, 2015).

Some studies show that identification with the collective in organization can affect employees in an important way and this can also affect their task performing. The number of studies of the relationship identification with motivation is small, but the conclusion is that identification is positively related to work motivations, task performance and contextual performance to the extent that social identity is salient and high performance is perceived to be in the group's or organization's interest. Membership in an organization implies multiple group memberships: membership in the organization in general, in one department, in one team or work unit etc. The question from the point of view of the social identity approach is how these identifications affect organizational behavior and especially work motivation and performance. Conclusion is that identification motivates group members to work for the group's interests, which in turn may affect performance (Knippenberg, 2000).

The following study shows the importance of motivation and consequences, respectively risks that the organization faces if it has demotivated employees. According to this study, employees who lack motivation in the workplace are a risk factor when it comes to executing day to day operations in business. Some of the most common risks that organization faces in lack of motivation are operational risks such as absenteeism, poor quality work and toxic work environment, personnel risks, reputational risks, environmental risks and financial risks. In terms of quality results, disgruntled employees will not perform

at their best hence which will affect competitiveness of products and services at the market. In the lack of motivation mutual relationship among employees will be disrupted and employees behavior will be affected. Also, employees who are not satisfied with their job might resort to quitting. These are all scenarios that should be avoided. For organizations to continue existing and retaining its workforce, they must keep on working on strategies that can help in motivating its employees. Motivated employees have a sense of belonging and loyalty to the organization. Production at work will bear more output in which it will be able to generate much needed income. If employees are satisfied absenteeism will gbe reduced thereby saving costs for the organization. Motivation have effect on employees as individuals to achieve the results and to be innovative because they believe in themselves which will benefit the organization to succeed. A further qualitative research on motivation strategies and theories is recommended because organizations which are results oriented will motivate their employees for reach their goals (Badubi, 2017). According to some authors, organizations should also select individuals who have high level of self-efficacy. These people will be motivated to engage in the behaviors that will keep them to perform well in the workplace. Organizations should consider employee level of self-efficacy when choosing among candidates for development programs and training especially if the training budget is limited because these people will tend to learn more from the training and to use that learning to enhance their job performance. This technique can lead to higher levels of job performance from employees which is important for high competitiveness.

CONCLUSION

Taking in consideration all previously mentioned paper works, studies and researches following conclusions were made. The most significant factors of employee motivation are material compensations such as salary, professional advancement and the opportunity for promotion (RQ:1). Effective motivation of employees has an extremely good effect on both the work performance of employees and the work performance of the company in general in terms of productivity, competitiveness and good organizational conditions (RQ:2). The consequences of poor motivation in the organization affect both employees and the results of the organization. Poor motivation results in high level of absenteeism and stress among employees, poor interpersonal relationships in the organization, high costs for the organization and poor productivity (RQ:3). The goal of employee motivation is to improve and develop the abilities of employees, increase their work performance and increase the efficiency of the organization. There are a large number of difficult and complex tasks facing management, and managers must have knowledge in the field of organization and psychology in addition to management and motivational techniques in order to properly encourage employees to achieve organizational goals.

REFERENCES

Buntak, K., Drožđek, I., Kovačić, R. (2013). Materijalna motivacija u funkciji upravljanja ljudskim potencijalima. *Technical journal 7*(1). pp 56-63.

Ismajli, N., Zekiri, J., Qosja, E., Krasniqi, I. (2015). The Importance of Motivation Factors on Employee Performance in Kosovo Municipalities. *J Pol Sci Pub Aff* 3:152.

Knippenberg, D. (2000). Work Motivation and Performance: A Social Identity Perspective. *Applied Psychology: An International Review 49*(3). pp 357-371.

Lunenburg, F. (2011). Self-Efficacy in the Workplace: Implications for Motivation and Performance. International Journal of Management, *Business and Administration 14*(1).

Mihailović, D. (2010). *Psihologija rada i organizacije*. Beograd: Fakultet organizacionih nauka.

Ridgeway, C. (1982). Status in groups: The Importance of Motivation. *American Sociological Review 47*(1). pp 76-88.

Rot, N. (1971). *Opšta psihologija*. Beograd: Zavod za udžbenike SR Srbije.

Sajfert, Z. (2009). *Menadžment*. Zrenjanin: Univerzitet u Novom Sadu, Tehnički fakultet „Mihajlo Pupin“.

Vidaković, T. (2012). Nematerijalne nagrade i njihov uticaj na motivaciju zaposlenih. *Časopis za ekonomiju i tržišne komunikacije*. pp 161-177.

LEADERSHIP, EMPLOYEE JOB SATISFACTION AND FINANCIAL PERFORMANCE OF THE ORGANIZATION

Predrag Mali
University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia
Bogdan Kuzmanović
University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia
Siniša Mitić
University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia
Edit Terek Stojanović
niversity of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia
E-mail: terekedita@gmail.com
Milan Nikolić
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia

ABSTRACT

In this paper, the impact of transformational and transactional leadership on employee job satisfaction and financial performance of the organization is examined. The research was conducted in organizations in Serbia. 220 questionnaires were collected. The dimensions of leadership have strong and positive effects on the dimensions of job satisfaction, as well as on the items of financial performance. Core transformational leader behavior and Contingent reward behavior have the strongest impact and predictive effects, while Contingent punishment behavior and High performance expectations have the weakest impact and predictive effects. There is a greater impact and predictive effect on job satisfaction dimensions than on financial performance items. Thus, leadership has a greater impact on individual performance, social relations and personal feelings of individual employees, while business performance is also influenced by a number of external factors, such as the market, competition and consumers.

Key words: Leadership, Job Satisfaction, Financial Performance, Employees, Serbia.

INTRODUCTION

Leadership has a significant impact on employee job satisfaction. For example, according to (Beebe, Blaylock, Sweetser, 2009), job satisfaction grows in conditions where there is a good relationship with the supervisor. Research in healthcare organizations (Platonova, Hernandez, Shewchuk, Leddy, 2006) has shown that recognizing the work performance of employees by the organization and leaders makes employees more satisfied. Likewise, leadership in healthcare institutions has an impact on nursing job satisfaction (Do Rego Furtado, Da Graça Câmara Batista, Ferreira Silva, 2011). The importance of transformational leadership for employee job satisfaction is especially emphasized. Thus, to the job satisfaction of employees in financial companies (in Kenya and the USA), transformational leadership has a strong and positive impact (Walumbwa, Orwa, Wang, Lawler, 2005). Transformational leadership has a favorable impact on job satisfaction in hotel employees in Germany (Rothfelder, Ottenbacher, Harrington, 2013). According to (Yang, Wu, Chang, Chien, 2011), transformational leadership and job satisfaction are also closely related when it comes to military organizations.

The financial performance of an organization, among other things, depends significantly on leadership. Yukl (2008) points out that in order to achieve high organizational effectiveness and high financial performance, it is necessary for a leader to be cooperative, flexible and adaptable to changes in the environment. Eubanks and Mumford (2010) suggest that mistakes made by a leader negatively affect an organization's performance. In the reference (Koene, Vogelaar, Soeters, 2002), it was determined that leadership in stores has a connection with financial performance.

A special place in examining the impact of leadership on performance has a consideration of the ways in which transformational and transactional leadership affect performance. Most of this research favors transformational leadership, that is, it points to a positive link between transformational leadership and performance, for example (Zhu, Chew, Spangler, 2005; Ensley, Pearce, Hmieleski, 2006; Ling, Simsek, Lubatkin, Veiga, 2008; MacKenzie, Podsakoff, Rich, 2001). At the same time, the reference (Ensley, Pearce, Hmieleski, 2006) even emphasizes the negative impact of transactional leadership, in the conditions of the existence of a dynamic environment (and such an environment is not a rare occurrence). Finally, according to (Barling, Weber, Kelloway, 1996), the level of financial performance of an organization can be significantly increased with the training of leaders to behave in accordance with the principles of transformational leadership. Some references suggest that, both transformational and transactional leadership have a positive impact on performance (Bass, Avolio, Jung, Berson, 2003; Elenkov, 2002). Similarly, Waldman, Ramirez, House, and Puranam (2001) state that charismatic and transactional leadership are predictors of financial performance. At the same time, it should be emphasized that the influence of rewarding behavior is especially emphasized (Bass, Avolio, Jung, Berson, 2003), as well as the fact that the influence of transformational leadership is still greater (Elenkov, 2002).

Based on previous presentations, it is certain that leadership has a significant impact on employee job satisfaction and financial performance of the organization. In this paper, the examination of these connections and influences is performed in organizations in Serbia. The impression is that, so far, not enough research has been done in Serbia that deals with this issue, so the scientific significance and justification of the research stems from that. In this paper, four hypotheses were set up:

H1: There are statistically significant correlation between leadership dimensions and job satisfaction dimensions, in organizations in Serbia.

H2: There are statistically significant correlation between leadership dimensions and financial performance items, in organizations in Serbia.

H3: There is a statistically significant predictive effect of leadership dimensions on job satisfaction dimensions, in organizations in Serbia.

H4: There is a statistically significant predictive effect of leadership dimensions on financial performance items, in organizations in Serbia.

METHOD

Survey instruments. In this research, the next instruments were used:

- Transformational leadership was measured using the Transformational Leadrship Behavior Inventory (TLI) instrument (Podsakoff, MacKenzie, Moorman, Fetter, 1990; MacKenzie, Podsakoff, Rich, 2001). There are 4 dimensions (14 items).
- Transactional leadership is measured by the instruments Contingent reward behavior scale and Contingent punishment behavior scale (Podsakoff, Todor, Grover, Huber, 1984; MacKenzie, Podsakoff, Rich, 2001). There are 2 dimensions (7 items).
- Employee job satisfaction was measured using the Job Satisfaction Survey (JSS) instrument (Spector, 1985). There are 9 dimensions (36 items).
- Financial performance is chosen based on performance that is often measured in other references, for example (Tan, Litschert, 1994; Wang, Tsui, Xin, 2011). Thus, a set of seven financial performances (items) was compiled, which were measured in this paper. All seven items were considered separately, and also as one dimension composed of these seven items (financial performance dimension).

Participants and data collection. The research was conducted in organizations in Serbia. A total of 250 questionnaires were distributed, but 220 questionnaires were used in further statistical analyzes (88% successfully completed). The research included 28 organizations.

RESULTS

The results of descriptive statistics are given in Table 1. The results of the correlation analysis are given in Tables 2 and 3 (*p<0.05; **p<0.01). The results of the regression analysis are given in Tables 4 and 5. Statistically significant values in these tables are given in bold and shaded fields. All results are given according to (Mali, 2021).

Table 1: Descriptive statistics for the observed dimensions and items

Dimensions and items	Abbr.	N	Min	Max	Mean	Std. Dev.	α
Core transformational leader behavior	L1	220	1,000	7,000	5,220	1,642	0,959
High performance expectations	L2	220	1,000	7,000	5,438	1,427	0,888
Supportive leader behavior	L3	220	1,000	7,000	4,853	1,727	0,964
Intellectual stimulation	L4	220	1,000	7,000	4,969	1,648	0,963
Contingent reward behavior	L5	220	1,000	7,000	4,806	1,719	0,958
Contingent punishment behavior	L6	220	1,000	7,000	5,097	1,552	0,945
Pay	JS1	220	1,000	6,000	3,402	1,319	0,832
Promotion	JS2	220	1,000	6,000	3,642	1,416	0,892
Supervision	JS3	220	1,000	6,000	4,628	1,206	0,885
Fringe benefits	JS4	220	1,000	6,000	3,598	1,367	0,884
Contingent rewards	JS5	220	1,000	6,000	3,637	1,363	0,884
Operating procedures	JS6	220	1,000	6,000	3,469	1,036	0,755
Coworkers	JS7	220	1,000	6,000	4,276	1,142	0,817
Nature of work	JS8	220	1,000	6,000	4,632	1,140	0,873
Communication	JS9	220	1,000	6,000	4,224	1,185	0,831
Productivity	FP1	220	1	5	3,62	,816	
Profitability	FP2	220	1	5	3,50	,830	
Market share	FP3	220	1	5	3,45	,866	
Sales growth	FP4	220	1	5	3,20	,905	
Competitive status	FP5	220	1	5	3,54	,928	
Asset growth	FP6	220	1	5	3,34	,874	
Salaries	FP7	220	1	5	3,25	,826	
Financial performance	FP	220	1,286	5,000	3,414	,685	0,902

Table 2: Coefficients of correlation between the leadership dimensions and job satisfaction dimensions

	JS1	JS2	JS3	JS4	JS5	JS6	JS7	JS8	JS9
L1	,481**	,626**	,704**	,561**	,572**	,492**	,553**	,490**	,607**
L2	,303**	,393**	,528**	,358**	,354**	,361**	,458**	,473**	,458**
L3	,492**	,595**	,692**	,584**	,569**	,494**	,515**	,419**	,554**
L4	,495**	,604**	,680**	,574**	,585**	,486**	,517**	,435**	,558**
L5	,524**	,632**	,641**	,594**	,624**	,539**	,507**	,386**	,573**
L6	,358**	,372**	,387**	,379**	,393**	,417**	,414**	,351**	,368**

Table 3: Coefficients of correlation between the leadership dimensions and financial performance

	FP1	FP2	FP3	FP4	FP5	FP6	FP7	FP
L1	,526**	,401**	,322**	,347**	,373**	,380**	,331**	,481**
L2	,430**	,309**	,271**	,217**	,300**	,274**	,315**	,379**
L3	,483**	,366**	,341**	,354**	,361**	,352**	,333**	,465**
L4	,493**	,381**	,333**	,340**	,356**	,374**	,338**	,469**
L5	,473**	,377**	,346**	,369**	,350**	,438**	,349**	,485**
L6	,321**	,197**	,246**	,168*	,234**	,239**	,212**	,290**

DISCUSSION

Discussion of the results of correlation analysis (in accordance with Mali, 2021). There are statistically significant, strong and positive correlations between the leadership dimensions and job satisfaction dimensions. In this way, hypothesis H1 was confirmed. Similar results, according to which leadership has an impact on job satisfaction, have been obtained in numerous references (Beebe, Blaylock, Sweetser, 2009; Do Rego Furtado, Da Graça Câmara Batista, Ferreira Silva, 2011;

Walumbwa, Orwa, Wang, Lawler, 2005; Rothfelder, Ottenbacher, Harrington, 2013; Yang, Wu, Chang, Chien, 2011).

Table 4: Regression analysis (dependent variables: job satisfaction dimensions)

			Independent						
Depen.	L1	L2	L3	L4	L5	L6	R^2	F	Sig.
				β					
JS1	,068	-,114	,067	,120	**,305**	**,170**	**0,311**	16,059	,000
JS2	**,283**	-,090	-,011	,132	**,312**	,095	**0,447**	28,692	,000
JS3	**,230**	,111	**,249**	,189	,037	-,009	**0,542**	42,000	,000
JS4	,065	-,092	,169	,149	**,272**	,135	**0,400**	23,694	,000
JS5	,117	-,128	-,006	,170	**,401**	**,156**	**0,428**	26,605	,000
JS6	,071	-,048	,052	,007	**,358**	**,233**	**0,337**	18,006	,000
JS7	,250	,088	,073	,032	,103	**,153**	**0,348**	18,941	,000
JS8	**,324**	**,225**	,030	,024	-,077	,075	**0,285**	14,134	,000
JS9	**,320**	,067	-,007	,057	,208	,063	**0,395**	23,165	,000

Table 5: Regression analysis (dependent variables: financial performance)

			Independent						
Depen.	L1	L2	L3	L4	L5	L6	R^2	F	Sig.
				β					
FP1	,242	,128	,044	,100	,078	,027	**0,299**	15,129	,000
FP2	,167	,095	-,016	,123	,127	-,049	**0,175**	7,534	,000
FP3	-,066	,070	,126	,074	,168	,070	**0,141**	5,813	,000
FP4	,068	-,015	,076	,076	,203	-,014	**0,145**	6,040	,000
FP5	,112	,080	,092	,063	,076	,030	**0,155**	6,496	,000
FP6	,072	,015	-,160	,080	**,425**	,042	**0,201**	8,919	,000
FP7	-,075	**,181**	,063	,107	,187	-,024	**0,149**	6,227	,000
FP	,093	,097	,041	,111	**,228**	,015	**0,268**	12,977	,000

The strongest influence on the dimensions of job satisfaction has the dimension L1 - Core transformational leader behavior, followed by L5 - Contingent reward behavior. Therefore, employees feel the greatest job satisfaction when they are sure that the leader has a clear and correct vision and when he knows how to achieve it, and also in conditions when the leader recognizes the good results of employees and praises them for it. So, for employee job satisfaction, in terms of leadership, two things are important: good leadership of the organization by the leader (long-term material security) and a sense of respect by the leader. The L6 - Contingent punishment behavior and L2 - High performance expectations have the weakest impact on job satisfaction dimensions. Clearly expressing the dissatisfaction of leaders and punishing, certainly can not cause a high level of satisfaction among employees. Also, if the leader constantly expects the employees to give the maximum and accepts only the best results, it can be burdensome for the employees, so high satisfaction is lacking.

There are statistically significant, strong and positive correlations between the dimensions of leadership and the items of financial performance. In this way, hypothesis H2 was confirmed. Similar results, according to which leadership has an impact on financial performance, have been obtained in numerous references (Yukl, 2008; Eubanks, Mumford, 2010; Koene, Vogelaar, Soeters, 2002; Bass, Avolio, Jung, Berson, 2003; Elenkov, 2002). The strongest influence on the items of financial performance have the dimensions L5 - Contingent reward behavior, followed by L1 - Core transformational leader behavior. In this way, leaders can achieve high business results through rewarding, good strategic leadership of the organization, encouraging behavior, and intellectual stimulation.

Discussion of the results of the regression analysis (in accordance with Mali, 2021). The dimensions L5 - Contingent reward behavior and L1 - Core transformational leader behavior have the strongest predictive effect on job satisfaction dimensions. This result is in line with the results of the correlation analysis. In addition, regression analysis revealed that dimension L6 - Contingent punishment behavior also has a significant predictive effect on job satisfaction dimensions. It is obvious that in regression analysis, due to the effect of a large number of independent variables, the behavior of

punishment comes to the fore and can be a predictor of certain dimensions of job satisfaction. These are the dimensions JS1 - Pay, JS5 - Contingent rewards, JS6 - Operating procedures and JS7 - Coworkers. In some cases, punishing behavior can motivate employees, who begin to perform better. Also, in the conditions of behavior through punishment, there can be increased solidarity, greater support and better relations between colleagues at work, so satisfaction with co-workers grows.

In Table 4, two more statistically significant predictive effects can be observed. One is the predictive effect of dimension L2 - High performance expectations on dimension JS8 - Nature of work. Expecting high performance from leaders can make employees feel that their job is important. Another statistically significant predictive effect has the dimension L3 - Supportive leader behavior on the dimension JS3 - Supervision. This is quite clear: if a leader expresses feelings and understanding for employees, it will logically lead to increased satisfaction with superiors and supervision.

According to Table 4, the corrected determination indexes R^2 have statistically significant and high values, ranging from 0.285 to 0.542. In this way, it was confirmed that there is a statistically significant predictive effect of the dimensions of leadership on the dimensions of job satisfaction, that is, hypothesis H3 was confirmed. Observed according to individual dependent variables (dimensions of job satisfaction), under the strongest predictive effect of leadership dimensions, there are dimensions JS3 - Supervision, JS2 - Promotion and JS5 - Contingent rewards.

The predictive effect on the items of financial performance is somewhat weaker, and the L5 dimension - Contingent reward behavior - has the strongest effect. Recognition of good employee results by leaders can significantly encourage employees and lead to improved business performance of the organization. In addition, regression analysis showed a statistically significant and positive predictive effect of the L2 - High performance expectations dimension on item FP7 - Salaries. Thus, the expectation of high performance may indicate good employee salaries.

According to Table 5, the corrected determination indexes R^2 have statistically significant and fairly high values, ranging from 0.141 to 0.299. In this way, it was confirmed that there is a statistically significant predictive effect of the dimensions of leadership on the items of financial performance, that is, hypothesis H4 was confirmed. Observed according to individual dependent variables (financial performance items), under the strongest predictive effect of leadership dimensions, there are items FP1 - Productivity, FP - Financial performance and FP6 - Asset growth.

CONCLUSION

There are statistically significant, strong and positive correlations between the dimensions of leadership and the dimensions of job satisfaction, as well as the item of financial performance. By comparing the strength of influence and predictive effects of the dimensions of leadership, it can be noticed that the predictive effect is stronger on the dimensions of job satisfaction. This is also logical: leadership has a greater impact on individual performance, social relations and personal feelings of individual employees, while business performance is also influenced by a number of external factors, such as the market, competition and consumers.

Leaders and managers in organizations in Serbia must be aware of the importance and strength of the influence of leadership on numerous organizational and business performances. Leaders and managers must be ready to continuously improve and enhance their knowledge, skills and behaviors. They need to improve their strategic action (vision, goals, employee motivation) and be prepared to praise employees when they are doing well and to acknowledge their good results and commitment. At the same time, leaders and managers need to reduce employee motivation through fear of expressing dissatisfaction and punishment. Also, they need to be careful in expecting high performance, especially to avoid punishment as a motivation for high employee performance.

REFERENCES

Barling, J., Weber, T., Kelloway, E.K. (1996). Effects of transformational leadership training on attitudinal and financial outcomes: A field experiment. *Journal of Applied Psychology*, *81*(6), 827-832.

Bass, B.M., Avolio, B.J., Jung, D.I., Berson, Y. (2003). Predicting unit performance by assessing transformational and transactional leadership. *Journal of Applied Psychology*, *88*(2), 207-218.

Beebe, A., Blaylock, A., Sweetser, K.D. (2009). Job satisfaction in public relations internships, *Public Relations Review*, *35*(2), 156-158.

Do Rego Furtado, L.C., Da Graça Câmara Batista, M., Ferreira Silva, F.J. (2011). Leadership and job satisfaction among Azorean hospital nurses: an application of the situational leadership model. *Journal of Nursing Management*, *19*(8), 1047-1057.

Elenkov, D.S. (2002). Effects of leadership on organizational performance in Russian companies. *Journal of Business Research*, *55*(6), 467-480.

Ensley, M.D., Pearce, C.L., Hmieleski, K.M. (2006). The moderating effect of environmental dynamism on the relationship between entrepreneur leadership behavior and new venture performance. *Journal of Business Venturing*, *21*(2), 243-263.

Eubanks, D.L., Mumford, M.D. (2010). Leader errors and the influence on performance: An investigation of differing levels of impact. *The Leadership Quarterly*, *21*(5), 809-825.

Koene, B.A.S., Vogelaar, A.L.W., Soeters, J.L. (2002). Leadership effects on organizational climate and financial performance: Local leadership effect in chain organizations. *The Leadership Quarterly*, *13*(3), 193-215.

Ling, Y., Simsek, Z., Lubatkin, M.H., Veiga, J.F. (2008). The impact of transformational CEOs on the performance of small- to medium-sized firms: Does organizational context matter? *Journal of Applied Psychology*, *93*(4), 923-934.

MacKenzie, S.B., Podsakoff, Ph.M., Rich, G.A. (2001). Transformational and transactional leadership and salesperson performance. *Journal of the Academy of Marketing Science*, *29*(2), 115-134.

Mali, P. (2021). *The influence of organizational culture and leadership on job satisfaction of employees and financial performance of the organization*. Specialist work, Faculty of Technical Sciences, Novi Sad, Serbia.

Platonova, E.A., Hernandez, R.S., Shewchuk, R.M., Leddy, K.M. (2006). Study of the relationship between organizational culture and organizational outcomes using hierarchical linear modeling methodology. *Quality Management in Health Care*, *15*(3), 200-209.

Podsakoff, Ph.M., MacKenzie, S.B., Moorman, R.H., Fetter, R. (1990). Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. *The Leadership Quarterly*, *1*(2), 107-142.

Podsakoff, Ph.M., Todor, W.D., Grover, R.A., Huber, V.L. (1984). Situational moderators of leader reward and punishment behaviors: fact or fiction? *Organizational Behavior and Human Performance*, *34*(1),21-63.

Rothfelder, K., Ottenbacher, M.C., Harrington, R.J. (2013). The Impact of Transformational, Transactional and Non-Leadership Styles on Employee Job Satisfaction in the German Hospitality Industry. *Tourism and Hospitality Research*, *12*(4), 201-214.

Spector, P.E. (1985). Measurement of human service staff satisfaction: Development of the job satisfaction survey. *American Journal of Community Psychology*, *13*(6), 693-713.

Tan, J.J., Litschert, R.J. (1994). Environment-strategy relationship and its performance implications: An empirical study of the Chinese electronics industry. *Strategic Management Journal*, *15*(1), 1-20.

Walumbwa, F.O., Orwa, B., Wang, P., Lawler, J.J. (2005). Transformational leadership, organizational commitment, and job satisfaction: A comparative study of Kenyan and U.S. financial firms. *Human Resource Development Quarterly*, *16*(2), 235-256.

Wang, H., Tsui, A.S., Xin, K.R. (2011). CEO leadership behaviors, organizational performance, and employees' attitudes. *The Leadership Quarterly*, *22*(1), 92-105.

Yang, F.H., Wu, M., Chang, C.C., Chien, Y. (2011). Elucidating the Relationships among Transformational Leadership, Job Satisfaction, Commitment Foci and Commitment Bases in the Public Sector. *Public Personnel Management*, *40*(3), 265-278.

Yukl, G.A. (2008). How leaders influence organizational effectiveness. *The Leadership Quarterly*, *19*(6), 708-722.

Zhu, W., Chew, I.K.H., Spangler, W.D. (2005). CEO transformational leadership and organizational outcomes: The mediating role of human–capital-enhancing human resource management. *The Leadership Quarterly*, *16*(1), 39-52.

THE IMPORTANCE OF CREATIVE POTENTIALS OF EMPLOYEES IN MODERN BUSINESS

Dragana Milosavljev
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia
E-mail: milosavljevd@yahoo.com
Verica Gluvakov
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia
Mila Kavalić
University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia
Maja Gaborov
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia
Melita Ćoćkalo-Hronjec
High school "Laza Kostic", Novi Sad, Republic of Serbia
Luka Đorđević
University of Novi Sad, Technical faculty „Mihajlo Pupin“, Zrenjanin, Serbia

ABSTRACT

One of the conditions for business success in a rapidly changing world is the ability to respond to changes in technology, the use of new business models, production, human recource management, etc. In this environment, the creativity of employees becomes imperative for the sustainability. Innovation and creative thinking provide the necessary competitive advantage. The creative potential of employees is influenced by numerous factors, such as the behavior of leaders, social interactions in the organization and team climate, communication and cooperation processes, as well as the design of the job and workplace. In order to improve the creative potential of employees it is necessary, first of all, for management to motivate its employees to be creative, influence their self-confidence to express ideas, reduce stress, which is a killer of creativity and, finally, reward them for good ideas.

Key words: Employees, Creativity, Innovation, Motivation, Leadership.

INTRODUCTION

The only constant factor in the business environment today is change. Companies are under constant pressure to hire employees who will be productive, efficient, innovative, willing to take risks and creative. In international business environment, one of the key successes of the organization is the engagement of such employees (Stanley, Davidson & Matthews, 2014). Highly innovative organizations are characterized by creative thinking and behavior of employees. Although creativity as a research topic has been analyzed for several decades in various disciplines, in the field of management and organization it became relevant only ten years ago (Boljević A, Strugar Jelača, Boljević S., 2017).

Employees are very valuable to the organization in which they work because each individual brings a certain knowledge and experience, which increases during work and it is considered as a human capital. Scientists believe that everyone has a great creative capacity and the challenge is to develop it (Stefanović, 2016). Creativity is defined as generating new and useful ideas and often requires employees to deviate from existing business practices in order to propose new ideas and further experiment and reearch with them (Amabile, 1983, Zhou & George, 2011, Liu, Pan & Zhu, 2021). However, often emerging ideas are not realized. The reasons for this are that they do not find support from leaders, they are difficult to implement, they require major changes, they are risky or organizations do not have enough resources to implement them. It is after this rejection that many

employees are demotivated to continue working on new ideas and future engagements in creative processes. For that reason, it is necessary to implement various methods, which would encourage employees to develop and use their creative potentials and not to „run away“ from them.

What can be noticed is that the appearance of the COVID-19 pandemic required organizations and employees to adjust their business to different conditions. In order for business to continue, it was necessary for organizations to develop innovative ideas, which would solve this problem. The innovation of organizations cannot be separated from the active participation of all employees. Creative performance of employees, where a creative idea is useful, plays a key role in solving problems, creating positive results and progress of the organization (Zhang & Zhao, 2021).

CREATIVITY IN MODERN BUSINESS

“Creativity is a characteristic given to all human beings at birth” – Abraham Maslow

Creativity is a characteristic of all people who have a wide view of the world, who notice and remember. In an organizational environment, creative behavior involves generating new ideas that change or improve the current situation in the organization or provide solutions to specific organizational problems (De Clarcq & Pereira, 2020). For decades, psychologists have been interested in personality characteristics that are associated with creative potential, and the most prominent are (Stefanović, 2016):

- strong intarzic motivation;
- wide interest;
- openness to new experiences;
- self-acceptance;
- conscientiousness;
- impulsiveness and high level of autonomy.

Most organizations have great potential to be creative, however, what sets one apart from the other is (Vuković, 2019):

- open work environment – creating an open and positive organizational culture affects the „psychological security" of employees.
- diversity – the greater the differences in experience, knowledge and education are, the conditions for creativity are better. People with different business experience and education look at the same problem from different perpectives, so the approach to solving that problem will be more diverse.
- trainings and education – in all jobs, pressure is often put on employees and almost no attention is paid to invest in their additional training and education, which are crucial for success.
- risk-taking – in order to be truly innovative, an organization must be prepared to deal effectively with risk-taking. If employees are afraid that they will be punished for failure, they will not propose new solutions, which will suppress creativity and innovation.
- clear purpose of existence – a sense of belonging to the organization is extremely important for encouraging creativity and innovation in employees.

FACTORS AFFECTING THE CREATIVE POTENTIALS OF EMPLOYEES

The success of an organization in turbulent business conditions requires a quick response to change. In order for that to be possible, it is necessary to create a creative work environment, in which employees will cultivate their creative potential, be more innovative, more productive, more satisfied with their work and where the probability of fluctuation will be reduced to a minimum. The creation of a creative work environment can be influenced by a number of factors, which can be grouped into four basic areas (Stanley, Davidson & Metthews, 2014):

- leadership behavior;

- team climate and social interactions;
- communication and cooperation processes;
- job design.

Research confirms that the nature and behavior of leaders have a significant impact on employee behavior (Smith, et al., 2008). Leadership behavior includes communication style, participatory goals setting, giving instructions and providing feedback focused on developing and modeling creative behavior. It is recommended that leaders emphasize the importance of creativity and support creativity with their behavior, to encourage employees to suggest new ideas, to acquire new knowledge and skills to improve their business performance (Stanley, Davidson & Metthews, 2014). Participatory and ethical leaders stand out here, who empower their employees to take responsibility for their work and, therefore, have a high level of work autonomy. Work autonomy gives employees the opportunity to explore new ideas, resulting in a higher level of creativity (Shafique, Ahmad & Klyar, 2019., Tourigny, et al., 2019., Liu, et al., 2020).

Team climate is a reflection of organizational culture and team-level climate. It is influenced by various factors that are manifested in the patterns of behavior, attitudes, beliefs, values and feelings that characterize life in the organization. Healthy team relationships contribute to the development of creativity. Also, when people from the team make open and constant contacts with the outside world, creativity in the workplace improves (Stanley, Davidson & Metthews, 2014).

Communication has an important impact in promoting creativity on many levels. According to research by Monge, Cozzens and Contractor (1992), group communication is positively associated with generating new ideas. The more open and direct the communication is, the greater is the flow of knowledge and new ideas and the creativity of employees in the organization will be on higher level.

The key characteristics of the job have an important role in the engagement of employees at work, where the job should suit the employee, more precisely, that the job requirements are tailored to the interests, values and personality of the employee. The job should be designed to contribute to the motivation and creative performance of employees. This means that tasks should not be simple and routine, but complex and challenging with a high level of autonomy (Oldham & Cummings, 1996).

IMPROVING THE CREATIVE POTENTIALS OF EMPLOYEES

In most organizations, the way of thinking created is a basic obstacle to creativity. Leaders are the ones who should identify and transform these ways of thinking and stimulate and motivate employees to develop their creative potential (Roberto, 2019). There are different ways in which leaders can stimulate employees to develop their creative potential. Some of the ways are (Eikenberry, n.d.):

- believe in employees – above all, leaders must break free and believe that everyone in the organization has creative potential. New ideas will never find their way if employees do not feel trusted by their superiors;
- show them examples from the past – in order to build self-confidence of employees, they need to be constantly reminded of past successes. It is also necessary to show proof of success by one's own example;
- redefine creativity – creativity is not just the creation of works of art or new ideas. Creativity is also the modification and adaption of some already existing ideas. Both leaders and employees should be aware of this;
- encourage them – everyone needs encouragement! It is important to let employees know that they are capable of doing their job. Also, it is important to give them feedback on the work done;
- help them – not all work should be transferred to employees. It is important to help employees and offer them the resources and space they need to be creative;
- be unique – in order for employees to be creative and focus on the task, it is important that they know exactly what needs to be solved;

– give people time – employees in the middle of a meeting cannot be asked to be creative at the moment. Creativity takes time.

CONCLUSION

Creativity in the workplace is a critical ability of an organization to innovate, gain a competitive advantage, increase success and improve long-term performance, because all innovations start with creative ideas. Creativity of employees means generating new and useful ideas, related to products, services and methods of work. Employees often do not express their creative ideas. The reasons for that are different, and some of them are that they may encounter condemnation/ridicule from colleagues, that the management will not support their proposals as well as the risk of failure. In order to really improve the creative potential of employees in the organization, „creative leadership" is needed. At the same time, the leader does not have to be creative, but must lead teams and promote creativity. This includes promoting open communication, psychological security of employees, their exchange of knowledge and experiences, learning and creating conditions for generating new ideas. People who work in organizations that encourage them to be cretive and innovative develop faster and better which affects faster achieving of organizational goals. For that reason, it is necessary to develop an organizational culture in which employees will be satisfied with both working conditions and salary, but also motivated to express their creative potentials and to constantly develop them.

REFERENCES

Amabile, T.M. (1983). The social-psychology of creativity-a componential conceptualization. *Journal of Personality and Social Psychology, 45*(2), 357-376. https://doi.org/10.1037/0022-3514.45.2.357

Boljević, A., Strugar Jelača, M., & Boljević, S. (2017). Research of organizational creativity elements in the function of organization's sustainable development. Ekonomski pogledi, 19(2), 99-113. https://doi.org/10.5937/EkoPog1702099B

De Clarcq, D., & Pereira, R. (2020). Knowledge-sharing efforts and employee creative behavior: the invigorating roles of passion for work, time sufficiency and procedural justice. *Journal of Knowledge Management, 24*(5), 1131-1155. https://doi.org/10.1108/JKM-06-2019-0274

Eikenberry, K. (n.d.). 7 Ways to Help Employees Reach Their Creative Potential. *Bud to Boss*. https://www.budtoboss.com/personal-professional-development/7-ways-help-employees-reach-creative-potential/

Liu, X., Baranchenko, Y., An, F., Lin, Z., & Ma, J. (2021). The impact of ethical leadership on employee creative deviance: the mediating role of job. *Leadership & Organization Development Journal, 42*(2), 219-232. https://doi.org/10.1108/LODJ-01-2020-0026

Liu, Z., Pan, X., & Zhu, T. (2021). Status-striving orientation, creative deviance engagement and employee creativity: perspective of structural strain. *Chinese Management Studies, 15*(4), 821-842. https://doi.org/10.1108/CMS-09-2020-0413

Monge, P.R., Cozzens, M.D., Contractor, N.S. (1992). Communication and Motivational Predictors of the Dynamics of Organizational Innovation. *Organization Science, 3*(2), 250–274. http://dx.doi.org/10.1287/orsc.3.2.250

Oldham, G.R., & Cummings, A. (1996). Employee Creativity: Personal and Contextual Factors at Work. *Academy of Management Journal, 39*(3), 607-634.

Roberto, M.A. (2019, February 4). Unleashing Your Workforce's Creative Potential. *Training Industry*. https://trainingindustry.com/articles/strategy-alignment-and-planning/unleashing-your-workforces-creative-potential/

Shafique, I., Ahmad, B. & Kalyar, M.N. (2019). How ethical leadership influences creativity and organizational innovation: examining the underlying mechanisms. *European Journal of Innovation Management, 23*(1), 114-133. https://doi.org/10.1108/EJIM-12-2018-0269

Smith, M., Busi, M., Ball, P., & Van Der Meer, R. (2008). Factors Influencing an Organisation's Ability to Manage Innovation: A Structured Literature Review and Conceptual Model. *International Journal of Innovation Management, 12*(4), 655–676. http://dx.doi.org/10.1142/S1363919608002138

Stanley, T., Davidson, P., & Matthews, J. (2014). Creative Work Environments and Employee Engagement: Exploring Potential Links and Possibilities. *Zesyty Naukowe, Uniwersytet Ekonomiczny w Krakowie, 9*(933), 33-51. https://doi.org/10.15678/ZNUEK.2014.0933.0903

Stefanović, A. (2016, October 20). Posedujete li kreativni potencijal? *Samoobrazovanje RS.* https://samoobrazovanje.rs/kreativni-potencijal/

Tourigny, L., Han, J., Baba, V.V. & Pan, P. (2019). Ethical leadership and corporate social responsibility in China: a multilevel study of their effects on trust and organizational citizenship behavior. *Journal of Business Ethics, 158*(2), 427-440. https://doi.org/10.1007/s10551-017-3745-6

Vuković, A. (2019, April 7). Od zaposlenih tražite kreativnost tek pošto im pružite osnovne uslove za to. *Linkedin.* https://www.linkedin.com/pulse/od-zaposlenih-tra%C5%BEite-kreativnost-tek-po%C5%A1to-im-pru%C5%BEite-vukovic

Zhang, M., & Zhao, Y. (2021). Job characteristics and millennial employees' creative performance: a dual-process model. *Chinese Management Studies, 15*(4), 876-900. https://doi.org/10.1108/CMS-07-2020-0317

Zhou, J., & George, J.M. (2001). When job dissatisfaction leads to creativity: encouraging the expression of voice. *Academy of Management Journal, 44*(4), 682-696. https://doi.org/10.2307/3069410

RESEARCH OF ESSENTIAL CHARACTERISTICS OF STUDENTS FOR THEIR PLACEMENT IN THE POSITION OF STUDENT – DEAN

Dragana Sajfert
ITS Information Technology School, Zemun, Belgrade, Republic of Serbia
E-mail: sdragana77@hotmail.com
Svetlana Anđelić
ITS Information Technology School, Zemun, Belgrade, Republic of Serbia
Milica N. Jeremić
ITS Information Technology School, Zemun, Belgrade, Republic of Serbia

ABSTRACT

The aim of this research was to examine which characteristics of an individual are important for his appointment to the position of president of the student parliament - student vice dean. One of the student representatives is also the student vice-dean, who is the main link between the students and the dean's office. As an instrument, a questionnaire was used, which consisted of 9 items - the personality trait of the leader. By processing the obtained data, 4 factors that influence the choice of the student vice-dean were singled out. The obtained factors are: sociability, leadership, responsibility according to obligations and the ability of the student vice-dean. Regardless of the situation, responsibility according to obligations has proven to be the most important in the election, by giving the same priority to persons related to the sociability of the student - vice dean. If we look for an answer to the question of the cruciality of four factors in these results, we can conclude that they indicate their interaction.

Key words: Student placement, Student parliament, Student vice-dean, Responsibility, Charactersitics.

INTRODUCTION

According to Seifert Z. et. al. (2006) a leader is a man who has the ability to lead other people to follow him, to do what he suggests. A leader knows how to win a group of people over to his idea, that is, to follow his decisions in achieving the set goal and the desired necessary changes. Marvketti and Kadolph (2010) leadership beliefs contribute to behaviors and attitudes. The purposes for conducting this study were 1) to gain an understanding of undergraduate students' leadership beliefs, 2) to implement three distinct leadership modules into an introductory textiles and clothing course, and 3) to assess the modules' effectiveness in promoting empowering leadership beliefs. Strong et. al. (2013) leadership is a versatile process that requires working with others in personal and professional relationships to accomplish a goal. Cultivating leadership skills is important for students who are developing professional competencies. Leadership characteristics and abilities should be evaluated to assist in learning student traits to better prepare students for their professions. Ming (2015) this research focused on a group of student leaders who have been elected by their peers to varius position in societies and clubs in the university setting. It explorer the leadership qualities that student leaders had and the unfluence of personality on those leadership qualities among student leaders. According to Stankov (1991), the leader summarizes the qualities that the group highly values or pushes outwards, as he states in his work, he is generally one of the best.

LITERATURE REVIEW RESEARCH OF STUDENT LEADER CHARACTERISTICS

Thomas Carlyle (1841/1994) in his book "On Heroes, Worship of Heroes and Heroic Society", Carlyle argued that the history of the world is only a biography of great people. He believed that history was

made by great individuals. Thomas Carlyle (1841/1994) starts from their competencies, he tried to identify the talents, skills and physical characteristics of people who rose to power. He created a theory about a great man. Initial socio-psychological research on leaders was influenced by the concept of "great people" as predestined leaders. Their focus was on the search for the characteristic personality traits of a successful leader. Lewin, Lipitt, and White (1939) developed a significant thesis on the impact of leadership on organizational performance. Byrd (1940) conducted research and came to the conclusion that intelligence, initiative, sense of humor and extraterrestrialism are the most important. Stogdil (1948) conducted a study of personality traits and divided them into: 1) abilities (intelligence, ability to see the situation, verbal ability and adaptability, 2) traits of sociability (sense of responsibility, activity and social perception, cooperation and popularity), motivational traits initiative and perseverance). Research for which the first approach was chosen and followed the initial hypothesis of the existence of significant differences between leaders and followers. Bell and French (1950) found that there is great consistency in the choice of leader with respect to their personality. Mann (1959) concluded in his research that the leader differs from the others in the expression of seven characteristics: intelligence, adaptability, extravertedness, dominance, masculinity, interpersonal sensitivity and low conservatism. The personality traits of the leader are determined by personality tests or the experimental procedure LFD (leadreless group discussion), in which the behavior of all members of the group is observed. Harari and McDavid (JW 1979) come to a similar set of leadership traits in their synthesis. and a sense of responsibility for the functioning of the group that is manifested in their willingness to take the initiative and the potential risk for actions that are expected to contribute to the success of the group. According to research by Kirkpatrick and Locke (1991), key traits of a leader include: instinct (a broader term that includes achievement, motivation, ambition, energy, perseverance, and initiative); motivation of leadership (desire to lead, but not to seek power as a goal in itself); honesty and integrity; self-confidence (which is associated with emotional stability); cognitive abilities; and business knowledge. We believe that the key qualities of a leader help the leader to acquire the necessary skills; formulate an organizational vision and an effective plan for its implementation; and take the necessary steps to implement the vision into reality. According to research by George, J. M. (1992) personality traits are relatively permanent personality traits that explain their behavior and allow prediction of their behavior. George, J. M. (1992) believes that understanding personality is important for many aspects, not only of individual but also of organizational behavior. George, J. M. (1992) cites two traits (positive and negative affectivity) presented as key dispositional determinants of affective reactions at work. The discussion focuses on theorizing and researching person-environment fitting, a complementary perspective on person-situation interactions and the relationship between personality and organizationally relevant outcomes. In his work, Ronald Heifetz (1994) presents clear, concrete recipes for anyone who needs to take the lead in almost any situation, in almost any organizational environment, no matter who is in charge. His strategy applies not only to people at the top, but also to to those who have to lead without authority - activists as well as presidents, managers, and front-line workers. Kretsch and Crutchfield (1980) state that some people show a tendency to be leaders in a large number of situations, and others only in some. With which personality traits is such leadership ability associated? Numerous studies of leaders in various types of groups show that such qualities as intelligence, dominance, self-confidence, strong ambition, and a strong sense of personal identity are very important. Krech, Crutchfield, and Balaki (1972) state that it has been found that leaders are generally more intelligent than their followers. It also seems to have been established by Mann (1959) in a review of published studies that leaders are quite consistent in their tendency to be more aligned, more dominant, more masculine, less conservative, and more interpersonal sensitive than ordinary members. Kretsch, Crutchfield, and Balaki (1972) state that studies on the personality characteristics of leaders have failed to reveal a single characteristic that would be common to all leaders. Certain traits such as, high intelligence, superiority and dominance seem to characterize capable leaders in a wide variety of studies. Ciampa (2007) lists the qualities a leader should have: A role model for employees, Self-aware, One who learns, Enjoys change, Visionary, Fully aware of current reality, Ethical and principled, One who thinks holistically, Good communicator, Positive thinking, Enthusiast, Realistic about yourself. Kouzes and Posner (2006) conducted one of the more recent studies of the characteristics of an effective leader. It was a survey with an enviable sample of leaders from five continents. The obtained results derived from the opinions of followers systematized a set of characteristics of favorite leaders.

The order of these qualities is as follows: Honesty, Vision, Competence, Inspiration, intelligence, fair play, breadth of vision, Empathy, Reliability, Determination, Imagination, Ambition, Courage, Maturity, Loyalty, Possession, Self-control, Independence. The actions of a leader are moral if the leader has the moral right to carry them out, if the actions do not endanger the rights of others and if the actions promote the moral rights of others Schumann (2001). These theories are called virtue-based theories and focus on what leaders are like as human beings. From this perspective, virtues come from the heart of the individual and are available to them Pojman (1995). According to the authors Rajkov and Seifert (1996), traits are certain personal qualities or characteristics of a person, such as physical characteristics (height, weight, appearance, energy), personality characteristics (dominance, extroversion, originality), skills and abilities (intelligence, knowledge). , technical competence), and social factors (interpersonal skills, sociability and sociometric position). According to the authors Mihailović and Ristić (2011) of the so-called theory of "great people" that prevailed during the first half of the twentieth century, it is emphasized that effective leadership is crucial for a leader to have a specific set of personality traits. According to previous research by Seifert, Z. et. al. (2011) state that the greats of world business, according to their own admission, did not start their careers with the intention of being leaders, but what they all have in common is that they strongly wanted to succeed. they were all curious, all self-taught, and all learned every day of their whole lives. The turning point outside the trait approach, however, came with two researchers, Stogdil (1948) and Mann (1959), who reviewed earlier studies and suggested that there are no traits that consistently distinguish leaders from non-leaders. The hypothesis on which the characteristics of a leader are based is that the professional selection of the right people will increase the efficiency and their functions and thus the organization. There is a hypothesis that organizations will work better if the people in leadership positions belong to the appropriate leadership profiles. The task of this research is to use various, primarily psychological techniques for personality assessment, to find students to assign them to appropriate positions.

METHODOLOGY

Research procedure and instrument

The paper aims to examine the impact of the student's choice of vice-dean on a democratic basis. We want to determine whether the voters of the student-vice-dean of the faculty chose independently. Based on the characteristics of leaders obtained as a result of previous research, a questionnaire with 21 items was constructed. Items have those characteristics that are characteristic of students that were assessed on the Likert five-point Likert scale (1932). Items are evaluated on a scale of 1-5, with 1 - I do not agree at all, and 5 - I completely agree. Survey participants were asked to choose a number from 1 to 5 that best describes the future performance of the student-vice dean.
characteristics characteristic of the faculty environment:

- responsibility towards faculty obligations (Stogdil)
- cooperative with fellow students (Stogdil)
- persistence and skill in solving tasks (Stogdil)
- acceptance or popularity among students (Borgatta)
- sensitivity to the needs and requirements of students (McDavid and Harari)
- take the initiative (McDavid and Harari)
- taking risks for possible student parliament failures (Mac David and Harari)
- readiness for conflict with professors.
- Appreciated by the professor

Sample

Students of all years of study, all fields. 116 students completed the questionnaire.

RESULTS

Based on the results of tests conducted using SPSS Windows release version 22, the results were obtained.In Table 1, the obtained results are processed by factor analysis, the method of main components. According to Katel's diagram, 4 factors are singled out, and also most of the questionnaire items are grouped into these 4 factors. According to their structure, the factors are called sociability, leadership, responsibility according to the obligations of the group and the ability of the assessed person.

Table 1: Matrix structure of the obtained factors

	Sociability	**Leadership**	**Responsibility according to the obligations of the group**	**Ability of student-vice-dean**
Responsibility towards faculty obligations			.79	
Cooperative with fellow students	.54	.56		
Persistence and skill in solving tasks			.81	
Acceptance or popularity among students	.68			
Sensitivity to the needs and requirements of the student		.61	.45	
Taking the initiative		.71	.35	
Taking risks for possible student parliament failures		.68	.38	
Readiness for conflict with professors		.57		.41
Appreciated by the professor			.73	.34

The results show groups of traits of their student-vice-deans: leadership ability.

Table 2: Significance of differences in the way students-vice-deans are elected for 4 groups of characteristics.

	M	**t**	**N**	**Significance of the difference**
Sociability	-.08	-.50	116	.063
Ability	-.35	-.233	116	.023
Leadership	-.44	-.231	116	.032
Odgovornost	-.72	-.437	116	.00

Table 3: Subsequent LSD tests for differences between traits in the group.

Features	**Features**	**M**	**Significance of the difference**
Sociability	Ability Leadership	-.28 .43	.00 .00
Ability	Responsibility Leadership	-.18 .68	.23 .23
Leadership	Responsibility Responsibility	07 .63	.64 .00

Table 4: Significance of gender differences in the expression of certain traits of student-vice dean selection for 4 groups of traits.

	t	**N**	**Significance of the difference**
Sociability	-.3.21	60	.00
Ability	-.227	60	.00
Leadership	-.378	60	.00
Responsibility	-.197	60	.05

DISCUSSION

By processing the obtained data, the questionnaire items were grouped into 4 factors.
Items are grouped by factors as follows in Table 1:

- sociability: cooperative with peers in the faculty, acceptance or popularity among students,
- leadership: cooperative with peers at the faculty, sensitivity to the needs and requirements of students, taking the initiative, taking risks for possible failures of the student parliament, willingness to conflict with professors.
- responsibility: responsibility towards faculty obligations, persistence and skill in solving tasks, sensitivity to the needs and requirements of students, taking the initiative, taking risks for possible failures of the student parliament, appreciated by the professor.
- abilities: readiness for conflict with professors, appreciated by professors.

Table 2. Shows the significance of differences in the way students-vice-deans are elected for 4 groups of characteristics. Significant differences are shown, sociability .063, ability .023, leadership .032. Table 3. Shows significance for responsibility .23, leadership .23, responsibility .64. Table 4 Shows the significance of gender differences in the expression of student selection characteristics. The only significance for responsibility is .05.

CONCLUSION

The results of this research indicate the existence of 4 factors that are important for the choice of student-vice-dean.

- sociability: cooperative with peers in the faculty, acceptance or popularity among students,
- leadership: cooperative with peers at the faculty, sensitivity to the needs and requirements of students, taking the initiative, taking risks for possible failures of the student parliament, willingness to conflict with professors.
- responsibility: responsibility towards faculty obligations, persistence and skill in solving tasks, sensitivity to the needs and requirements of students, taking the initiative, taking risks for possible failures of the student parliament, appreciated by the professor.
- abilities: readiness for conflict with professors, appreciated by professors.

REFERENCES

Bell, G. B., & French, R. L. (1950). Consistency of individual leadership position in small groups of varying membership. *Journal of Abnormal and Social Psychology, 45*, 764–767.

Bird, C. (1940) *Social psychology*. New-York,Appeleton-Century.

Carlyle Thomas (1841/1994) *Sada i prije*. M. Republika, str. 337.

Ciampa, G. (2007) Caring for the fallen: A personal story. *World War II Chronicles, 33*(Spring), 25-29. Retrieved from.

George J. M. (1992). The role of personality in organizational life: Issues and evidence. *Journal of Management, 18*(2), 185-213.

Harari, H. and MCDavid, J. W. (1979) Situacional influence on moral justice: A study of "Finking". *Journal of Personality and Social Psychology, 11*, 240-244.

Heifetz Ronald (1994). *Leadership without easy answers*. Harvard University Press.

Kirkpatrick Shelly and Locke A. Edvin (1991). *Leadership: Do Traits Matter, Academy of Management Executive, 5*(2), 48-60.

Kouzes, J. M., & Posner, B. Z. (2006). *The Leadership Challenge*. Jossey – Bass, San Francisco.

Kreč Dejvid, & Kračfild Ričard. (1980). *Elementi psihologije*. Naučna knjiga, Beograd.

Kreč, D., Kračfild, R.S., i Balaki, I. (1972). *Pojedinac u društvu*. Beograd: Zavod za udžbenike i nastavna sredstva

Lewin Kurt, Lipitt Ronald i White Ralph (1939). *Bulletin of the Society for the Psychological Study of Social Issues, 10,* 263-308.

Likert, R. (1932).Technique for the Measurement of Attitudes. *Archives of Psychology, 22*(140), 1-55.
Locke, E., & Kirkpatrick S. (1991). *The Essence of Leadership: The four Keys to Leading Successfully*. Lexington Books
Mann, R. D. (1959) A review of the relationship between persinality and performance in small groups. *Psychological Bulletin, 56*, 241/270.
Marcketti, B. S., & Kadolph, J. S. (2010) Expowering student leadership beliefs: An Exploratory study. *International Journal of Teaching and Learning in Higher Education, 22*(2), 131-139.
Mihailović, D., & Ristić, S. (2011). *Liderske kompetencije*. Univerzitet u Beogradu, Fakultet Organizacionih Nauka, Beograd.
Pojman, I. P. (1995). *Ethical theory: Classical and contemporary readings (2nd ed.).* Belmont, CA: *Wadsworth.*
Rajkov, M., Sajfert, Z. (1996). *Ljudska strana menadžmenta*. Fakultet organizcionih nauka, Univerziteta u Beogradu, Beograd.
Sajfert, Z., Đorđević D, & Bešić C. (2006) *Leksikon menadžmenta*. Univerzitet u Novom Sadu, Tehnički fakultet "Mihajlo Pupin", Zrenjanin.
Sajfert, Z., Nikolić, M., Jovanović, D., Tasić, I., & Kudumović, M. (2011). Researching the characteristics of leaders in Serbia. *Technics Technologies Education Management, 6*(1), 140-146.
Schumann, P. L. (2001). A moral principles framework for human resource management ethics. *Human Resource Management Review*, 11, 93-111.
Sing, M. C. (2015). Personality and Leadership Qualities among Student Leaders, American Journal of Applied Psichology, 4(3), 27-32.
Stankov, L. (1991) Pažnja i inteligencija. *Psihologija, 24*(3-4), 65-92.
Stogdil, R. M. (1948). Personal factors associated with leadership: A survey of the literature. *Journal of Psychology, 25*, 35-71.
Strong, R., Wynn, T., Irby, T., & Linder J. (2013). The Relationship Between Students Leadership Style and Self Directed Learning Level. *Journal of Agricultural Education, 35*(2), 174-185.

SELECTION OF CANDIDATE FOR ASSEMBLING BLINDS USING THE TOPSIS METHOD

Dijana Tadić
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia
E-mail: dijana.tadic@tfzr.rs

ABSTRACT

In this paper, the application of the TOPSIS method is presented, in the service of choosing the operator for assembling blinds. The method was applied to solve the dilemma facing the production manager for production blinds, in a medium-sized company based in the Central Banat District. Out of the five candidates who entered the shortlist of the selection, the evaluation of the best candidate for the operator for preparation blinds. Thanks to its characteristics, the TOPSIS method ranked the candidates according to the considered criteria, and contributed to the support of the manager in making a decision.

Key words: TOPSIS method, Application, Operator selection.

INTRODUCTION

The selection of candidates for employment may include various criteria, such as general impression, results of psychological and personality tests, testing of knowledge in a certain field, testing of motor skills, speed of movement, etc. The results of shortlisted candidates often don't oscillate much, and each of the potential employees predominates in at least one domain, and the choice often depends on the nuances. When these differences are difficult to rank and make a decision, by applying the TOPSIS method, which is considered one of the best in the world (Nikolić, 2012), doubts can be removed, and based on the budget, contribute to easier selection of candidates who will best suit the position.

The use of different methods in the selection of candidates is considered desirable in all companies (Junker, 2020). In this paper, the application of the TOPSIS method is presented, when selecting one of the five candidates for the position of blinds assembly. This position requires memory of over 100 different models of blinds, ie knowledge of how the blinds are assembled. Due to the large selection and complexity of the model, it is desirable to express logical inference, in order to easily master which actions should be taken depending on the type, size and model of the blind. In addition to the expressed logic, it is desirable that the operator has positive qualities, which characterize team-minded people. The working environment consists of dozens of other employees, who are closely related to the position of assembling venetian blinds, and good cooperation and communication with them is extremely important for the sake of a favorable working atmosphere. Of the other criteria, they were taken into consideration; general impression of the candidate, work experience in the same or similar positions, ie experience of working with a smaller or larger number of people, and notice period, if the candidate is currently employed, due to the urgency of filling the vacancy.

Defining what is expected from the candidate significantly simplifies the selection process, and finding the defined one is directly related to the further success of the company (Smoljan, 2020). Based on the stated criteria, and their evaluation, the procedure of applying the TOPSIS method is presented, the way in which the ideal solution was reached.

ABOUT THE TOPSIS METHOD

The method called "Technique for Order Preference by Similarity to Ideal Solution", abbreviated TOPSIS, was developed by Ching-Lai Hwang and Kwangsun Yoon (1981). This method belongs to the group of multi-criteria decision analysis methods (MCDA), and as such, it has been applied by many researchers in various fields of study. The TOPSIS method is considered to be one of the most popular methods of this set (Hwang & Yoon, 2012).

The success of solving complex multicriteria problems has been proven by numerous researchers (Velasques & Hester, 2013; Zavadskas & Turskis, 2011), who have faced the challenge of decision-making. Methods from this group of analysis have found their wide application in practice (Mahdevari et al., 2014; Njegus, 2019; Şengül et al., 2015; Zavadskas et al., 2016; Zyoud & Fuchs-Hanusch, 2017), and the work on their advancement and improvement, does not abate even today (Wątróbski et al., 2019). It is characteristic of this method that with the help of it, the answer is reached, which action is the closest to the ideal solution, and which is the furthest. The outcome of the solution depends on the weight of the criteria, which the assessor sets himself (Olson, 2004). Depending on the ability to assess the importance of criterion, the TOPSIS method will rank the possibilities of choice, and provide insight into the distance of the solution from the ideal. This method stands out for its simplicity, computational efficiency and comprehensiveness of the mathematical concept (Palczewski & Sałabun, 2019).

APPLICATION OF THE TOPSIS METHOD

When choosing a new operator, the production manager has the option to choose one of 5 shares: a_1 – Candidate 1, a_2 – Candidate 2, a_3 – Candidate 3, a_4 – Candidate 4, a_5 – Candidate 5. The selection is made on the basis of the following attributes (criteria):
A_1 – Work experience on the same or similar jobs [year], (maximum requirement)
A_2 – General impression that the candidate makes at the interview (qualitative assessment)
A_3 – Personality test results (qualitative assessment)
A_4 – Logic test results (qualitative assessment)
A_5 – Notice period that the candidate must meet due to employment in another company [day] (minimum requirement)

Estimates (quantitative and qualitative) of all actions according to attributes are given in the initial decision matrix, Table 1:

Table 1: Stock ratings by attributes

		A_1	A_2	A_3	A_4	A_5
O =	a_1	5	excellent	very good	1	7
	a_2	2	good	very good	6	14
	a_3	1	bad	good	3	7
	a_4	8	excellent	good	7	7
	a_5	1	excellent	very good	8	7

Qualitative grades are usually translated into the following grades: 1 - very low level, 3 - low, 5 - average (medium), 7 - high and 9 - very high level. Therefore, the initial matrix obtained the following values, Table 2:

Tabela 2: Transfer of qualitative to quantitative assessments

		A_1	A_2	A_3	A_4	A_5
O =	a_1	5	9	7	1	7
	a_2	2	5	7	6	14
	a_3	1	3	5	3	7
	a_4	8	9	5	7	7
	a_5	1	5	7	8	7

For further processing of the matrix, the normalized decision matrix N is determined. Normalization is performed using formula no. 1.

Formula 1:

$$n_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}},$$

Where is:
i = 1, 2,..., m – number of shares,
j = 1, 2,..., n – attribute number.

Attribute A5 (number of days of notice period), had a request to transfer minimization Aj into maximization Aj, and for this the following expression is used, formula 2:

Formula 2:

$$n_{ij} = 1 - \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}}$$

Based on the calculated, the matrix obtained the following values, Table 3:

Table 3: Translating minimization to maximization for attribute A_5

N =	A_1	A_2	A_3	A_4	A_5
a_1	0,5130	0,6271	0,4987	0,0793	0,6464
a_2	0,2052	0,3484	0,4987	0,4758	0,2929
a_3	0,1026	0,2090	0,3562	0,2379	0,6464
a_4	0,8208	0,6271	0,3562	0,5551	0,6464
a_5	0,1026	0,3484	0,4987	0,6344	0,6464

The weights of the criteria are defined according to the assessment of the decision maker. To determine the choice of operator, the following values were taken:
$w_1 = 0,1$
$w_2 = 0,2$
$w_3 = 0,3$
$w_4 = 0,3$
$w_5 = 0,1$
Weight normalized matrices are calculated using formula 3:

Formula 3:

$$V = W * N$$

After its use, the matrix obtained the following values, Table 4:

Table 4: Weight normalized matrix

V =	A_1	A_2	A_3	A_4	A_5
a_1	0,0513	0,1254	0,1496	0,0238	0,0646
a_2	0,0205	0,0697	0,1496	0,1427	0,0293
a_3	0,0103	0,0418	0,1069	0,0714	0,0646
a_4	0,0821	0,1254	0,1069	0,1653	0,0646
a_5	0,0103	0,0697	0,1496	0,1903	0,0646

After this step, the selection of the ideal and negatively ideal solution is performed, the best solution is selected for each criterion, according to possible actions. Therefore:

- Ideal solution = 0,0821, 0,1254, 0,1496, 0,1903, 0,0293
- Negatively ideal solution = 0,0103, 0,0697, 0,1069, 0,0238, 0,0646

The Euclidean distance to the ideal solution was then calculated using formula 4:

Formula 4:

$$S_i^* = \sqrt{\sum_{j=1}^{n} \left(v_{ij} - v_j^*\right)^2}, \quad i = 1,2,..., m$$

So it is:

$S_1^* = 0,1730$
$S_2^* = 0,0957$
$S_3^* = 0,1713$
$S_4^* = 0,1221$
$S_5^* = 0,0975$

And the distance to the negative ideal solution is obtained by the expression, formula 5:

Formula 5:

$$S_i^- = \sqrt{\sum_{j=1}^{n} \left(v_{ij} - v_j^-\right)^2}, \quad i = 1,2,..., m$$

So it is:

$S_1^- = 0,0813$
$S_2^- = 0,1316$
$S_3^- = 0,1531$
$S_4^- = 0,1682$
$S_5^- = 0,1719$

Then the relative proximity to the ideal solution was calculated, formula 6:

Formula 6:

$$C_i^* = \frac{S_i^-}{S_i^* + S_i^-}, \quad i = 1,2,..., m$$

So it is:

$C_1^* = 0,3197$
$C_2^* = 0,4746$
$C_3^* = 0,4718$
$C_4^* = 0,5794$
$C_5^* = 0,3619$

The obtained solutions enable the ranking of actions according to the proximity of the ideal solution, and as a solution the following was obtained:

1. Rank: action a_4 (Candidate 4)
2. Rank: action a_2 (Candidate 2)
3. Rank: action a_3 (Candidate 3)
4. Rank: action a_5 (Candidate 5)
5. Rank: action a_1 (Candidate 1)

CONCLUSION

Based on the attached, it can be concluded that the procedure of the TOPSIS method is very easy and simple to use. 6 formulas were used and 4 tables were made. This resulted in the result that Candidate 4 is the closest to the ideal solution, ie that it is the most suitable for filling a vacant job for assembling blinds. Then, one can notice a very small difference in the qualifications of the 2nd and 3rd Candidates, but that for a nuance Candidate 2 is closer to the ideal solution. Then Candidate 5 is ranked, and as the last and least suitable Candidate 1.

The TOPSIS method can be applied to a very wide range of problems, and dilemmas that require decision-making in the form of choices. The bigger the dilemma and the smaller the difference between the qualifications of the actions, the more desirable the support of some of the methods. For the sake of greater certainty in the correctness of the decision made, other methods can be applied, and the results can be compared.

REFERENCES

Hwang, C. L., & Masud, A. S. M. (2012). *Multiple objective decision making-methods and applications: a state--of-the-art survey* (Vol. 164). Springer Science & Business Media.

Hwang, C. L., & Yoon, K. (1981). Methods for multiple attribute decision making. In *Multiple attribute decision making* (pp. 58-191). Springer, Berlin, Heidelberg.

Junker, K. (2020). *Personnel selection and employment* (Doctoral dissertation, University of Rijeka. Faculty of Maritime Studies, Rijeka. Department of Logistics and Management).

Mahdevari, S., Shahriar, K., & Esfahanipour, A. (2014). Human health and safety risks management in underground coal mines using fuzzy TOPSIS. *Science of the Total Environment*, *488*, 85-99.

Nikolić, M. (2012). *Decision making methods*. University of Novi Sad, Technical Faculty. „Mihajlo Pupin", Zrenjanin, (pp. 132).

Njeguš, A. (2019). Application of multicriteria analysis methods in the selection of candidates for work in the tourism industry. In *Sinteza 2019-International Scientific Conference on Information Technology and Data Related Research* (pp. 505-510). Singidunum University.

Olson, D. L. (2004). Comparison of weights in TOPSIS models. *Mathematical and Computer Modelling*, *40*(7-8), 721- 727.

Palczewski, K., & Sałabun, W. (2019). The fuzzy TOPSIS applications in the last decade. *Procedia Computer Science*, *159*, 2294-2303.

Şengül, Ü., Eren, M., Shiraz, S. E., Gezder, V., & Şengül, A. B. (2015). Fuzzy TOPSIS method for ranking renewable energy supply systems in Turkey. *Renewable Energy*, *75*, 617-625.

Smoljan, D. (2020). *Innovative employment systems in an IT company* (Doctoral dissertation, The University of Applied Sciences Baltazar Zaprešić. Chair of Economics, Management and Marketing).

Velasquez, M., & Hester, P. T. (2013). An analysis of multi-criteria decision making methods. *International Journal of Operations Research*, *10*(2), 56-66.

Wątróbski, J., Jankowski, J., Ziemba, P., Karczmarczyk, A., & Zioło, M. (2019). Generalised framework for multi-criteria method selection. *Omega*, *86*, 107-124.

Zavadskas, E. K., & Turskis, Z. (2011). Multiple criteria decision making (MCDM) methods in economics: an overview. *Technological and Economic Development of Economy*, *17*(2), 397-427.

Zavadskas, E. K., Mardani, A., Turskis, Z., Jusoh, A., & Nor, K. M. (2016). Development of TOPSIS method to solve complicated decision-making problems - An overview on developments from 2000 to 2015. *International Journal of Information Technology & Decision Making*, *15*(03), 645-682.

Zyoud, S. H., & Fuchs-Hanusch, D. (2017). A bibliometric-based survey on AHP and TOPSIS techniques. *Expert systems with applications*, *78*, 158-181.

Session C: MARKETING MANAGEMENT

Papers (pp. 171-196):

THE CONCEPT OF B2B CUSTOMER JOURNEY IN E-COMMERCE

Anja Jakšić
University of Novi Sad, Faculty of Technical Sciences, Republic of Serbia
Aleksandar Sofić
University of Novi Sad, Faculty of Technical Sciences, Republic of Serbia
Branko Markoski
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Republic of Serbia
E-mail: markoni@uns.ac.rs
Slavko Rakić
University of Novi Sad, Faculty of Technical Sciences, Republic of Serbia
Ksenija Mitrović
University of Novi Sad, Faculty of Technical Sciences, Republic of Serbia
Jelena Spajić
University of Novi Sad, Faculty of Technical Sciences, Republic of Serbia

ABSTRACT

In the last few years, the concept of the Customer Journey is very interesting among marketing researchers. This concept has a significant value for companies to better understand their customers and build an inherent relationship. The focus of the research of this paper is the Customer Journey in the field of Business-to-Business (B2B) Electronic commerce (e-commerce). Through a relevant literature review, the theoretical background of the B2B Customer Journey in e-commerce was examined. This paper aims to develop a clear understanding of the Customer Journey in B2B e-commerce. The result of this research is a summary of key touchpoints in the researched area based on the literature review.

Key words: Electronic commerce, E-commerce, Business-to-business, B2B, Customer journey.

INTRODUCTION

With the development of the Internet and communication technology, a new business opportunity has been created. The rapid changes that are happening in the market have changed the way companies do business. The big impact of marketing has led to new opportunities and challenges in comparison with traditional B2B e-commerce (Bhandari, et al., 2017). New trends in the business shift offline business processes to the online environment (Prajapati, Zhou, Zhang, Chelladurai, & Pratap, 2021). New technologies have led to a change in the environment in which B2B participants operate, and an increasing part of the business is moving to online platforms. To be as successful as possible, companies adjust their strategies to be competitive in the market and increase the number of customers. The new technology gives advantages in business processes to facilitate communication with customers and provide the product or service that best meets their needs. One of the main management goals is to create a powerful customer experience (Lemon & Verhoef, 2016) to secure a market position. To better understand customer behavior and provide a strong customer experience, the concept of the Customer Journey has become very important (Tueanrat, Papagiannidis, & Alamanos, 2021). Rusthollkarhu et al. (2021) found a lack research of on the B2B Customer Journey in the marketing literature. They examined papers from Scopus and Web of Science to research the B2B model of Customer Journey (Rusthollkarhu, Aarikka-Stenroos, & Mero, 2021). In their paper, they concluded that the Customer Journey concept cannot deal with the complexity of the B2B environment. This paper presents the relevant literature review of the development of B2B e-commerce and the concept of the Customer Journey in online business processes.

LITERATURE REVIEW

The specifics of B2B e-commerce

E-commerce is „every type of business transaction, where users start and develop their business or trade with products and services through electronic channels“ (Doluschitz, 2002). In terms of management, e-commerce offers several advantages in trading, so online trading became popular and the usage has significantly increased in recent years (Riester & Huber, 2015). It is a convenient way to compare prices and products on one trading platform, instead of wasting time contacting each supplier separately (Xiaoping, Chunxia, Dong, & Xiaoshuan, 2009). Established e-markets ensure the level of trust for the customer, as only those who are members have the opportunity to trade (Xiaoping, Chunxia, Dong, & Xiaoshuan, 2009). According to Butler and Fitzgerald, the key factor of success are the functions that ensure competitive performance for an organization (Butler & Fitzgerald, 1999). The latest price information and availability of products make it easier to achieve the best business deals (Xiaoping, Chunxia, Dong, & Xiaoshuan, 2009). E-commerce is divided into three categories: business-to-business (B2B), business-to-customer (B2C), and customer-to-customer (C2C) (Fernando, Assegaff, & Rohayani, 2016). The development of new technologies is a very important element of the creation of B2B buying and selling processes (Syam & Sharma, 2018). New trends in business are affecting the growing number of business users who connect via the Internet to facilitate business processes (Lin, 2006). B2B online communication platforms enable a business to transfer its offline environment into an online space (Peruchi, Pacheco, Todeschini, & Caten, 2022). Sila (2013) defined B2B e-commerce as “electronic information systems designed to handle in an effective manner transaction between trading partners”. B2B e-markets function as an electronic hub, connecting large numbers of buyers and sellers and automating business transactions (Kaplan & Sawhney, 1994). The main role of B2B e-markets is to enable and facilitate the exchange of products and information and support all segments of the exchange process (Bakos, 1997). Most B2B activities are focused on online exchange (Wise & Morrison, 2000), which makes e-commerce an important competitive advantage (Fauska, Kryvinska, & Strauss, 2013). At the global level, the majority of economies do not use the whole potential of new technologies (Alsaad, Taamneh, Sila, & Elrehail, 2021). In the study conducted in 2021, the authors compared the acceptance of B2B e-commerce in developed and developing countries (Alsaad, Taamneh, Sila, & Elrehail, 2021). According to this study, elements of B2B e-commerce vary according to the degree of economic development (Alsaad, Taamneh, Sila, & Elrehail, 2021). In 2013, the research of adoption factors surged that company size and type and management level are elements that impact the adoption of B2B e-commerce (Sila, 2013).

B2B Customer Journey

B2B e-market business models are determined by how well they can meet the needs of companies, how much potential value they offer, and how much realized value they can provide to companies that adopt this business model (Dai & Kauffman, 2002). “The ability to predict a customer’s response to a digital action has remarkable value” (Bhandari, et al., 2017). Companies’ supply chains, products, and marketing strategies, their processes, and operations even the business models – will be shaped by the way B2B relationships are formed and transactions are conducted in e-markets (Wise & Morrison, 2000). Companies focus on customer experience through various touchpoints: from thought, searches, purchase, usage to future repurchase (Spajić, Bošković, Milić, & Lalić, 2020). The evidence from the study conducted in 2019, surges that the B2B Customer Journey is more complex than the B2C Customer Journey (Østerlund, West, Stoll, & Kowalkowski, 2019). Some authors as main differences between B2B and B2C point out the next elements: longer purchase decision time, smaller amount of customers, fewer transactions of B2B customers in comparison with B2C customers (Bakhtievab, 2016). The complexity also can be observed in terms of transactions which rise with more expensive purchases (Østerlund, West, Stoll, & Kowalkowski, 2019).

The great value of a customer experience in the case of e-commerce is the ability to “align customer goals with business goals” (Ritonummi, 2020). The customers communicate with companies through so many different channels which impact the customer experience (Lemon & Verhoef, 2016). Spajić et

all. (2020) explain in their research that "customer experience can be explained with a customer's journey with a firm overtime during the purchase cycle across multiple touchpoints". According to Rustholllkarhu et al. (2021) the customer journey "has been identified as one of the most promising concepts in understanding B2B buying and selling processes in modern digital environments". Besides the buying and selling processes, the B2B Customer Journey implies customer experience, value creation, brand value, and social media (Rustholllkarhu, Aarikka-Stenroos, & Mero, 2021).

There are recognized three stages of the Customer Journey (Lemon & Verhoef, 2016):
- Pre-purchase – every interaction with a brand before the purchase transaction
- Purchase – all customer actions during the purchase
- Post-purchase – all customer interactions with a brand after the purchase.

Other authors divided the Customer Journey into four stages (Fischer, Seidenstricker, Berger, & Holopainen, 2021):
- The consideration stage
- The evaluation stage
- The buying stage
- The customer experiences the product and builds an expectation for future relationships.

In their paper, Lemon and Verhoef presented the scheme of the Customer Journey. In this scheme are presented the touchpoints in each phase of the Customer Journey.

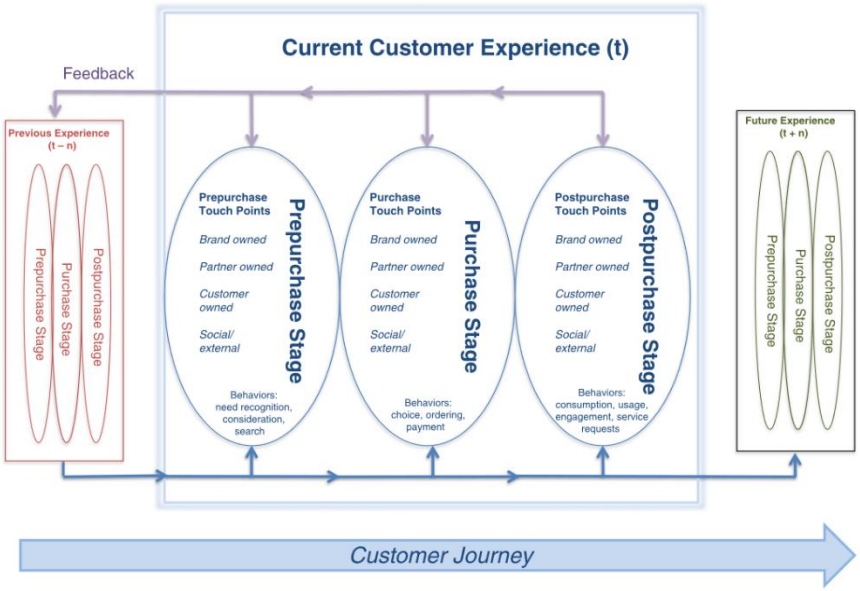


Figure 1: Customer Journey scheme with touchpoints
Source: (Lemon & Verhoef, 2016)

The understanding of the buying process has changed, with the customer journey, customer experience, and touchpoints being modernized (Steward, Narus, Roehm, & Ritz, 2019). Thanks to new technologies, B2B customers have access to more information, both about suppliers and other customers' buying experiences (Steward, Narus, Roehm, & Ritz, 2019). According to Bhandari et al. (2017), a model based on monitoring digital consumer behavior helps to realize sales potential, through improving the customer experience and creating personalized marketing.

The key touchpoints of B2B customer journey in e-commerce

As it is mentioned above, the Customer Journey is divided into three phases: pre-purchase, purchase, and post-purchase. Each touchpoint is independent and can be updated with the improvement of technology (Micheaux & Bosio, 2018). Throughout the journey, customers interact with the company

at specific touchpoints (Lemon & Verhoef, 2016). "Each touchpoint can lead to the positive or negative customer experience" (Aichner & Gruber, 2017). The touchpoints are crucial for Customer Journey mapping, providing the knowledge of what is happening in each moment (Micheaux & Bosio, 2018). Previous studies found out different types of touchpoints: brand-owned, partner-owned, customer-owned, and social/external/independent (Lemon & Verhoef, 2016). In the study where were examined only brand-owned touchpoints, throughout the company's website and mobile application, the result showed that the evaluation of the buying process differs significantly across different channels and touchpoints (Wagner, Schramm-Klein, & Steinmann, 2018). Based on value, each touchpoint can be categorized into four groups (Barann, Betzing, Niemann, Hoffmeister, & Becker, 2020):

1. Search and navigation,
2. Product information,
3. Selection and checkout and
4. Communication and support.

In this study, the authors realized that customers during their journey, are less interested to interact with the company through communication and support (Barann, Betzing, Niemann, Hoffmeister, & Becker, 2020). Other authors in their research claim that the website and social media are ones of crucial touchpoints (Lim, Al-Aali, & Heinrichs, 2014). In terms of customer satisfaction, each touchpoint plays an important role (Aichner & Gruber, 2017). Mapping the touchpoints during the Customer Journey gives a company opportunity to improve their business, putting the client in the center (Spajić, Bošković, Milić, & Lalić, 2020).

CONCLUSION

According to the literature review, transformation into online business affected marketing decisions and actions of the companies. Customer expectations are changing rapidly with the advancement of technology, and companies need to adjust their business as soon as possible. There has been developed the concept of Customer Journey that explains the buying process in the new business environment. Managing this Journey and touchpoints is one of the important steps for companies that want to be competitive in the market and understand choices customers make during their journey. Depending on the authors and previous research, each research had different touchpoints related to the industry where the surveys were conducted. According to the cited authors, there is a gap in research in terms of the digitalization of the B2B Customer Journey. This paper enriches the research of the B2B Customer Journey and provides a summary of the key touchpoints.

REFERENCES

Aichner, T., & Gruber, B. (2017). Managing Customer Touchpoints and Customer Satisfaction in B2B Mass Customization: A Case Study. International Journal of Industrial Engineering and Management, 131-140.

Alsaad, A., Taamneh, A., Sila, I., & Elrehail, H. (2021). Understanding the global diffusion of B2B E-commerce (B2B EC): An integrated model. Journal of Information Technology, 36(3), 258-274. doi:10.1177/0268396220961396

Bakhtievab, E. (2016). The role of the customer journey in B2B content marketing. 12th Annual International Bata Conference for Ph.D. Students and Young Researchers (DOKBAT) (str. 31-42). Zlín: Tomas Bata University in Zlín.

Bakos, J. (1997). Reducing buyer search costs: Implications for electronic marketplace. Management Science, 1676-1692.

Barann, B., Betzing, J. H., Niemann, M., Hoffmeister, B., & Becker, J. (2020). Exploring customers' likeliness to use e-service touchpoints in brick and mortar retail. Electronic Markets.

Bhandari, A., Rama, K., Seth, N., Niranjan, N., Chitalia, P., & Berg, S. (2017). Towards an Efficient Method of Modeling "Next Best Action" for Digital Buyer's Journey in B2B. Lecture Notes in Computer Science, 107-116. doi:10.1007/978-3-319-62416-7_8

Butler, T., & Fitzgerald, B. (1999). Unpacking the systems development process: an empirical application of the CSF concept in a research context. The Journal of Strategic Information Systems, 351-371.

Dai, Q., & Kauffman, R. J. (2002). Business Models for Internet-Based B2B Electronic Markets. International Journal of Electronic Commerce, 41-72.

Doluschitz, R. (2002). Electronic Business in der Agrar– und Ernährungswirtschaft – Ernüchterung und Konsolidierung lösen die anfängliche Euphorie ab. German Journal of Agricultural Economics.

Fauska, P., Kryvinska, N., & Strauss, C. (2013). The role of e-commerce in B2B markets of goods and services. International Journal of Services, Economics, and Management, 5, 41-71. doi:doi:10.1504/ijsem.2013.051872

Fernando, E., Assegaff, S., & Rohayani, H. (2016). Trends Information Technology in E-Agriculture. International Conference on Information Technology, Computer and Electrical Engineering (ICITACEE), (str. 351-355). Semarang, Indonesia.

Fischer, H., Seidenstricker, S., Berger, T., & Holopainen, T. (2021). Digital Sales in B2B: Status and Application.

Kaplan, S., & Sawhney, M. (1994). E-hubs: The new B2B marketplaces. Harvard Business Review, 93-115.

Lemon, & Verhoef. (2016). Understanding Customer Experience Throughout the Customer Journey. Journal of Marketing: AMA/MSI Special Issue, 69-96.

Lim, J.-S., Al-Aali, A., & Heinrichs, J. H. (2014). Impact of satisfaction with retailers touchpoints on purchase behavior: the moderating effect of search and experience product type. Marketing Letters, 26(2), 225–235. doi:10.1007/s11002-014-9334-x

Lin, A. (2006). The acceptance and use of a business-to-business information system. International Journal of Information Management, 26(5), 386-400. doi:doi:10.1016/j.ijinfomgt.2006.04.002

Micheaux, A., & Bosio, B. (2018). Customer Journey Mapping as a New Way to Teach Data-Driven Marketing as a Service. Journal of Marketing Education. doi:10.1177/0273475318812551

Østerlund, M. M., West, S., Stoll, M. O., & Kowalkowski, C. (2019). Using customer journey mapping to improve industrial sales and customer experience. 26th EurOMA Conference. Helsinki, Finland.

Peruchi, D., Pacheco, D., Todeschini, B., & Caten, C. (2022). Moving towards digital platforms revolution? Antecedents, determinants, and conceptual framework for offline B2B networks. Journal of Business Research, 344-363. doi:10.1016/j.jbusres.2021.12.036

Prajapati, D., Zhou, F., Zhang, M., Chelladurai, H., & Pratap, S. (2021). Sustainable logistics network design for multi-products delivery operations in B2B e-commerce platform. Sādhanā. doi:10.1007/s12046-021-01624-1

Riester, R., & Huber, J. (2015). Betriebsmittel. Agrarmärkte, 307-318.

Ritonummi, S. (2020). User experience on an ecommerce website - a case study. Jyväskylä University.

Rusthollkarhu, S., Aarikka-Stenroos, L., & Mero, J. (2021). B2B Customer Journey: Axioms and Actor Roles. Proceedings of the European Marketing Academy, 50th. Madrid.

Sila, I. (2013). Factors Affecting the Adoption of B2B e-Commerce Technologies. Electronic Commerce Research. doi:10.1007/s10660-013-9110-7

Spajić, J., Bošković, D., Milić, B., & Lalić, D. (2020). Boosting customer experience value through customer journey design. 9th International Conference on Mass Customization and Personalization - Community of Europe (MCP - CE 2020). Novi Sad.

Steward, M. D., Narus, J. A., Roehm, M. L., & Ritz, W. (2019). From transactions to journeys and beyond: The evolution of B2B buying process modeling. Industrial Marketing Management. doi:10.1016/j.indmarman.2019.05

Syam, N., & Sharma, A. (2018). Waiting for a sales renaissance in the fourth industrial revolution: Machine learning and artificial intelligence in sales research and practice. Industrial Marketing Management, 135-146.

Tueanrat, Y., Papagiannidis, S., & Alamanos, E. (2021). Going on a journey: A review of the customer journey literature. Journal of Business Research, 336-353. doi:10.1016/j.jbusres.2020.12.02

Wagner, G., Schramm-Klein, H., & Steinmann, S. (2018). Online retailing across e-channels and e-channel touchpoints: Empirical studies of consumer behavior in the multichannel e-commerce environment. Journal of Business Research.

Wise, R., & Morrison, D. (2000, November-December). Business Models - The Future of B2B. Preuzeto sa Harvard Business Review: https://hbr.org/2000/11/the-future-of-b2b

Xiaoping, Z., Chunxia, W., Dong, T., & Xia

THE ROLE OF PUBLIC RELATIONS IN BUILDING A REPUTATION AND COMPETITIVE ADVANTAGES

Milica Josimović
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia
E-mail: milica.josimovic@tfzr.rs
Milena Cvjetković
College of Academic Studies, "Dositej", Belgrade, Serbia

ABSTRACT

Organizations strive to create a position and recognition in the market by creating the best possible image of themselves. The organization creates the conditions for building the best possible reputation in the market by establishing effective communication and public relations with stakeholders. It is a long-term process that requires continuous labor and the effort that the organization invests in order to fight for its place in the market and the loyalty of its customers. The paper analyzes the role of public relations in building a reputation through which a company can create a competitive advantage in the market. Organizations that have recognized the importance of establishing good relations with their stakeholders, have created the conditions for building corporate reputation and identity. In conditions of fierce competition that is a powerful tool for improving business competitiveness. Public relations in the context of integrated marketing communications has a significant role that is becoming increasingly important in the digital age and communication through information technology. The public relations strategy aims to create a favorable environment for the entire business of the organization.

Key words:: Reputation, Identity, Competitive advantage, Marketing communication, Public relations.

INTRODUCTION

Public relations is considered a special management function whose assignment is to create and preserve the organization's reputation, strengthen trust, understanding and goodwill between the organization and its public groups, organize comprehensive business communications with various stakeholders of the organization. Corporate identity emphasizes the uniqueness of an organization through its culture, behavior, strategy, and organizational communication. The reputation of the organization is the opinion of all stakeholders arising from the business of the organization. Effective reputation management, as a strategic asset, contributes to business success and financial and non-financial benefits. The trust, satisfaction and loyalty that result from the relationship between the organization and other stakeholders serve to measure corporate reputation. Corporate reputation is based on direct experience or convincing indirect information, which generates the attitudes and emotions of an individual (or group) towards the organization (Vlastelica Bakić, 2012). So, reputation is a consequence of corporate identity, performance and communication, and all that forms the beliefs and attitudes of stakeholders and citizens towards the company. Moreover, corporate reputation is a perceptual assessment of stakeholders in an organization (Walker, 2010).

Through corporate communications, the organization provides a basis for establishing and building good relationships between the organization and other stakeholders (Beurer-Zuellig et al., 2009). The strategy of corporate communications in the function of reputation management can be focused on managing relations with the business community, organizing events and participating in important events in the environment, generating publicity and adopting the philosophy of socially responsible business. Empirical research (Vlastelica Bakić, 2012) confirmed the formation of a good reputation of companies in Serbia, by achieving good performance in all five categories according to the model

developed by this research: business performance and work environment, products and services, social responsibility, marketing communication, public relations.

THE IMPORTANCE OF PUBLIC RELATIONS FOR THE ORGANIZATION

Representing the public and building a personal brand, with the intention of being accepted, means the application of integrated marketing communications (Milovanović et al., 2018). The modern moment of business significantly changes the communication process. The consumer has taken control of communications and he decides whether and when he will receive the message (Kitchen, Schultz, 2009).

It has been confirmed that the efficiency of communication affects the achievement of customer loyalty more than when it comes to the quality of communication. This only indicates that organizations must turn special attention to the choice of appropriate communication channels, similar to the needs, requirements and preferences of customers (Hanninen, Karjaluoto, 2017). Maintaining a competitive position in the market is conditioned by customer satisfaction, which is the result of efficient interaction of services and promotional activities.

The research confirmed the strong influence of public relations on the image and reputation of the bank, but also on the final business result. In addition, the interaction between clients and content created by marketing communications is emphasized (Paponjak, Lalić, 2019). The results of the research indicate that the potential of digital media for achieving two-way and symmetrical relations between the organization and the public through PR services is insufficiently used. Strategic public relations management can still be considered a highly normative model that has not fully taken root in practice, despite studies that speak of its exceptionality (Milojević, 2015). Public relations, as a managerial function, the implementation of all elements of socially responsible business, achieves it has socially useful role, while taking on the role of "conscience" of the company (Skoko, Mihovilović, 2014). The results of the research confirm the existence of a significant direct link between public relations and economic effects (Nikolić et al., 2011).

The priorities that companies need to make towards existing and potential customers include finding the appropriate measure for the use of modern information and communication technologies. These are the basic guidelines for establishing good long-term relationships in global business conditions, in which there are smaller opportunities to achieve competitive advantages, which is why building good relationships with customers is becoming a key area of exploitation of today's companies (Ratković et al., 2011).

THE ROLE OF PUBLIC RELATIONS IN REPUTATION BUILDING

Reputation is a factor in differentiating companies in the market and creating a relationship of trust, not only with consumers, but also with all other stakeholders. In this way, the company realizes significant economic benefits. Reputation is a valuable assets of a company because it cannot be imitated, bearing in mind that a good reputation requires many years of high or stable product quality, constant innovation and flexibility in relation to the demands of stakeholders. Therefore, it is a strategic asset, ie a resource that creates a competitive advantage (Krstić et al., 2021).

Good corporate image and identity over a long period of time affect the creation of reputation, which contributes to improving business performance and creating long-term competitive advantage of organizations (Stanković et al., 2007). They increase the value of the product or brand and represent a kind of guarantee of quality. Corporate reputation is the result of comprehensive internal and external activities of the organization, as well as ways of communicating with various stakeholders.

Public relations is stand out from the domain of marketing communications, because their immediate goal is not to sell and make a profit, but to provide a favorable environment for the entire business (Broom, 2010). However, in the long run, it can certainly contribute to achieving marketing goals and achieving commercial effects, which is the basic goal of every company (Ognjanov, 2013). There are numerous studies that have proven the positive relationship between corporate reputation and company performance (Lopez, Iglesias, 2010). The strategic importance of reputation can be traced through its roles through which it signals to stakeholders its values and strategic commitments, but also provides them with a greater ability to predict the behavior of the same organization in the future (Dowling, Moran, 2012).

Reputation is built in the process of communicating the company's strategic decisions to significant stakeholders. It is defined as the perception they have about certain attributes of the company (for example, innovation, quality of products and services, social responsibility, financial discipline, building and retaining talented staff, etc.) compared to the competition (Mitić, Ognjanov, 2013). Online communication can be used to influence stakeholders 'assessments of an organization's and services' products, corporate responsibility, success, its ability to change and develop, and its public image. In addition, online communication can generate reputational benefits by strengthening relationships with stakeholders and building social capital for the organization (Aula, 2011). Corporations are increasingly investing in social media, hoping to improve their corporate reputation by engaging and managing relationships with a variety of stakeholders. The research confirmed that the frequency of publishing company content on its Facebook is not a significant predictor of its corporate reputation (Ji et al., 2017).

Reputation management requires coordination between internal understanding and external expectations (Verčič, Ćorić, 2018). A corporation with a public relations or communications department that has a well-defined job description is more likely to have a better reputation because it has an open internal communication system and allows its employees to plan and work strategically and efficiently (Kim, Cha, 2014). In addition to the fact that websites or social networks play an important role in informing the public about socially responsible business (Tetrevova et al., 2019), they also play an important role the company's annual reports, voluntary reports on socially responsible business, voluntary environmental reports and corporate promotional materials and printed materials (eg newspapers), which are often distributed online (Tetrevova, 2018).

Research on the practical use of communication channels and PR tools for creating public relations among managers of Czech chemical industrial companies showed that the company's internet presentation, sponsorship of sporting events and realization and presentation of environmental information are the most commonly used and most effective PR tools (Jelinkova et al., 2020). Companies recognize the importance of their reputation and PR skills. To improve their ability to understand and communicate with stakeholders, companies continue to develop new PR techniques. In order to improve customer orientation and price premium to gain profitability, companies must earn a positive perception of their employees' capabilities, not only in CSR activities but also in other general characteristics, by focusing on CSR strategy (Lee et. al., 2016).

PUBLIC RELATIONS AND COMPETITIVE ADVANTAGE

Companies that understand that communication is an integral part of their strategic success will not only gain a competitive advantage but also maintain no matter unfavorable conditions. Moreover, communication is a factor of differentiation to meet customer needs, engage and motivate employees, drive innovation, improve efficiency, demonstrate social responsibility during the crisis and protect the organization's interests from adverse rules and regulations (Nvabueze, Mileski, 2018).

The results of the research confirmed that the implementation of advertising and public relations activities, innovative activities and new technologies and the implementation of socially responsible business contributes to improving the company's image and has a positive effect on building

competitive advantages (Marakova et al., 2021). A company that wants an advantage over competitors in the market must shape the image of the product in a way that starts a story about it, which is achieved through adequate business communication. The integrated public relations / advertising function contributes to the general image and reputation of the company and its products and services (Miletić, 2010).

Shuba (2016) investigated the impact of innovative marketing on online and offline marketing activities. In his research, he discovered that thanks to innovations, online marketing exceeds offline marketing by 15%. Internet marketing is especially growing in the field of public relations. The dimensions of communication models of public relations and public-organization relations have the greatest influence and effect on the dimension of trust, then the dimension of expertise and finally the dimension of financial performance. This indicates that there is a greater impact on the credibility of the company than on the financial performance (Vlahović et al., 2020).

The results of the research on the impact of media relations on certain organizations and business outcomes of companies in Serbia indicate that the greatest impact has modern media on the company's credibility, as well as market share and sales growth when it comes to financial performance. By improving media relations, the company creates a good basis for raising the level of organizational and business performance, and it is best to use the synergistic effect of a number of media relations items (Terek et al., 2015).

Research (Nikolić et al., 2012) confirmed a strong relationship between internal communication and the strategic and economic effects of doing business in Serbian companies. Increasing the level of internal communication improves both strategic and economic effects in companies.

CONCLUSION

Globalization, restructuring of the world economy, changes in the financing and implementation of system projects, the ubiquitous use of information and communication technologies (ICT), and the intensity of competition prevailing in the market force contractors to reconsider competitive strengths and customer expectations. Marketing can help build a company to differentiate itself from its competitors, cultivate and/or retain customers and thus create a competitive advantage.

The paper emphasizes the importance of public relations in building a reputation and gaining a competitive advantage in the market. Corporate reputation and image are two valuable intangible resources of the company, which aim to build its long-term competitive advantage and market value. Good reputation and brand identity are very important to achieve competitive advantage. A continuous and successful reputation is built on credibility and organizational transparency. Reputation and image are two separate, intangible assets that support each other and companies need each of them to build their competitive advantage.

REFERENCES

Aula, P. (2011). Meshworked reputation: Publicists' views on the reputational impacts of online communication. Public relations review, 37(1), 28-36.

Beurer-Zuellig, B., Fieseler, C., & Meckel, M. (2009). A descriptive inquiry into the corporate communication profession in Europe. Public Relations Review, 35(3), 270-279.

Broom, G. (2010). Učinkoviti odnosi s javnošću, Zagreb: Mate

Dowling, G., & Moran, P. (2012). Corporate reputations: built in or bolted on?. California Management Review, 54(2), 25-42.

Hänninen, N., Karjaluoto, H. (2017). The effect of marketing communication on business relationship loyalty. Marketing Intelligence and Planning, 35 (4), 458-472.

Jelinkova, M., Lostakova, H., & Machackova, K. (2020, June). The level of use of public relations tools and evaluation of their impact on the reputation of chemical companies from the perspective of the Czech

public. In Proceedings of 11th International Scientific Conference Business and Management 2020. 293-301.
Ji, Y. G., Li, C., North, M., & Liu, J. (2017). Staking reputation on stakeholders: How does stakeholders' Facebook engagement help or ruin a company's reputation?. Public Relations Review, 43(1), 201-210.
Kim, J. R., & Cha, H. (2014). The Effect of Public Relations and Corporate Reputation on Return on Investment. Asia Pacific Public Relations Journal, 14.
Kitchen, P.J., Schultz, D.E. (2009). IMC: New horizon/false dawn for a marketplace in turmoil?. Journal of marketing communications, 15 (2-3), 197-204.
Krstić, B., Jovanović, M., & Janjić, I. (2021). Značaj reputacije kao intelektualne imovine za konkurentnost preduzeća. Naučne publikacije državnog univerziteta u Novom Pazaru Serija B: Društvene & humanističke nauke, April 2021, 4 (1), 17-28.
Lee, E. M., Lee, H. J., Pae, J. H., & Park, S. Y. (2016). The important role of corporate social responsibility capabilities in improving sustainable competitive advantage. Social Responsibility Journal, 12 (4), 642-653.
López, V. & Iglesias, S. (2010), A Reputational– Performance Framework in an SME Context: SomeEmpirical Evidence from Spain, The Irish Journal ofManagement, Vol.29, No.2, str. 35-66
Marakova, V., Wolak-Tuzimek, A., & Tuckova, Z. (2021). Corporate Social Responsibility As a Source of Competitive Advantage in Large Enterprises. Journal of Competitiveness, 13(1), 113-128.
Miletić, S. (2010). Komuniciranje imidža i konkurentska prednost preduzeća. Facta universitatis-Economics and Organization, 7 (1), 119-128.
Milojević, A. (2015). Dvosmerni simetrični odnosi s javnošću i digitalne komunikacione tehnologije: između teorije i prakse1. CM Komunikacija i mediji, 10(35), 81-108.
Milovanović, S., Lukinović, M., Baltezarević, R. (2018). Lični brend i integrisano marketing komuniciranje. Megatrend Review, 15 (1), 177-186.
Mitić, S., & Ognjanov, G. (2013). Konkurentska prednost i korporativne komunikacije. Marketing, 44(4), 343-353.
Nikolić, M., Savić, M., Ćoćkalo, D., Brkić, V. S., & Ivin, D. (2011). The impact of Serbian public relations on economic indices. Public Relations Review, 37(3), 332-335.
Nikolić, M., Terek, E., Vukonjanski, J., & Ivin, D. (2012). The impact of internal communication on strategic and economic effects in Serbian companies. Public Relations Review, 38 (2), 288-293.
Nwabueze, U., & Mileski, J. (2018). Achieving competitive advantage through effective communication in a global environment. Journal of International Studies, 11(1).
Ognjanov, G. (2013). Marketinške komunikacije, Centar za izdavačku delatnost Ekonomskog fakulteta u Beogradu, Beograd.
Paponjak, S., & Lalić, D. (2019). Uloga odnosa s javnošću u bankarskom sektoru. Zbornik radova Fakulteta tehničkih nauka u Novom Sadu, 34(07), 1277-1280.
Ratković, M., Grubić, G., Tasić, S., Damnjanović, A., & Matić, R. (2011). Good relationship with customers as competitiveness advantage factor. Conference: 14. Međunarodna konferencija Upravljanje kvalitetom i pouzdanošću ICDQM-2011, Beograd, 180-186.
Shuba, S. (2016). Paths to and off purchase: quantifying the impact of traditional marketing and online consumer activity. Journal of the Academy of Marketing Science, 44 (4), 440-453.
Skoko, B., & Mihovilović, M. (2014). Odnosi s javnošću u funkciji društveno odgovornog poslovanja. Praktični menadžment: stručni časopis za teoriju i praksu menadžmenta, 5(1), 84-91.
Stanković, Lj., D. Radenković-Jocić & Đukić, S. (2007). Unapređenje poslovne konkurentnosti, Ekonomski fakultet, Niš.
Terek, E., Nikolić, M., Vukonjanski, J., Gligorović, B., & Janković, B. (2015). The impact of media relations on certain organizational and business performances: Serbian case. Public Relations Review, 41 (3), 370-372.
Tetrevova, L. (2018). Communicating CSR in high profile industries: case study of Czech chemical industry. Inzinerine Ekonomika-Engineering Economics, 29, 478–487.
Tetrevova, L., Patak, M., & Kyrylenko, I. (2019). Webbased CSR Communication in Post-communist countries. Applied Economics Letters, 26, 866– 871.
Verčič, A. T., & Ćorić, D. S. (2018). The relationship between reputation, employer branding and corporate social responsibility. Public Relations Review, 44(4), 444-452.
Vlahović, M., Nikolić, M., Ivaniš, M., Tasić, I., & Terek, E. (2020). The impact of communication models of public relations and organization–public relationships on company credibility and financial performance. Communications, 45 (4), 479-502.
Vlastelica Bakic, T. (2012): Reputation management by applying concept of corporate social responsibility in marketing and public relations, Doctoral Dissertation, University of Belgrade, Serbia.
Walker, K. (2010): A Systematic Review of the Corporate Reputation Literature: Definition, Measurement, and Theory. Corporate Reputation Review, 12(4), 357–387

THE ROLE OF PUBLIC RELATIONS IN CORPORATE SOCIAL RESPONSIBILITY

Biljana Maljugić
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia
E-mail: biljanamaljugic28@gmail.com
SrđanaTaboroši
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia

ABSTRACT

The field of communication includes Public Relations, but also Corporate Social Responsibility. The importance of these business functions is increasingly recognized in their synergy and joint action, and it has been confirmed in business practice. Information Technologies provide opportunities for new forms of communication that build on the theory of Public Relations. Corporate Social Responsibility improves the business and the quality of life of the entire society. The International Standard ISO 26000 provides guidelines for conducting socially responsible business activities in a global environment. Greater commitment to this standard is recommended for domestic companies in the Republic of Serbia in order to increase competitiveness and reputation.

Key words: Public relations, Corporate social responsibility, Communications, Digital media.

INTRODUCTION

The concept of publicity in the theory of public relations first appeared in England in the 17th century in the fields of politics, economics, and culture. With the development of Enlightenment thought in a democratic society until today, there have been changes in the application of this theory. Social scientists, guided by the network concept of dynamic social life and the politics of the global environment encompassed by digital communication technologies, have contributed to public relations (Pieczka, 2019).

There are opinions and arguments that PR in society should have the role of advocacy and counter-advocacy while respecting the traditional foundations of PR, ie mutual understanding, strategic communication, relationship management, and reputation. The role of PR is persuasive communication (Maloney, & McGrath, 2021).

In today's ever-changing media environment, according to Yang and Saffer (2019), in order for companies to build and maintain corporate legitimacy and reputation, effective CSR communication on CSR initiatives is needed. This leads to the requirement for PR practitioners to overcome communication barriers such as consumer skepticism and information overload. In the digital communication environment, by overcoming the one-way communication model, PR practitioners will achieve more efficient implementation of corporate responsibility programs by considering corporate CSR messages on online social networks.

Digital and social media, as well as improved content on socially responsible business, sponsorships, and community relations are only part of the activities of modern PR activities. In addition to being structural, PR also has rhetorical power in society. The need for more complex PR has been demonstrated in the theory of stakeholders and CSR in order to promote and defend the interests of the organization in a competitive market (Maloney, & McGrath, 2021).

PUBLIC RELATIONS

Defining Public Relations

Đorđević and Bešić (2005) defined Public Relations - PR as a complex business activity that includes several dimensions with knowledge of several different disciplines, such as psychology, communication, journalism, economics, culture, and others, in order to combine them to achieve effective communication (according to Nikolić, 2012).

Gordon (2011) states that public relations have developed from several different disciplines, such as psychology, sociology, media communications, and management (according to Nikolić, 2012).

In the context of business organization, public relations is a business function of management that through two-way communication has a very important role in representing the organization and creating positive impressions with stakeholders.

If the value of information is raised to a higher level including theories of strategic management then image and reputation, according to Wojcik (2021), help PR in managing the organization. In addition, properly targeted image information values, and reputations through PR practice provide benefits in management processes.

According to the authors Kriyantono and McKenna (2017), public relations has two propositions. The first is that public relations is a function of management, and the second is that public relations take responsibility for managing the relationship between the organization and the public.

Public Relations Activities

According to Nikolić (2012), shaping public opinion, ie the dominant attitude of society towards an issue, phenomenon, or event, requires significant communication efforts of the organization directed towards the public. Due to the growing number of media, the development of technologies, and fast communications, public relations are constantly changing and adapting. Lately, PR is becoming an increasingly dynamic discipline. It is especially important to emphasize the role of PR in building trust with consumers and target groups, as well as the fact that PR is strategically important for the organizations' business, which has been confirmed in many practical studies (Nikolić, 2012).

Chen, Hung-Baesecke, and Chen, (2020) suggest theoretical and practical developments of a dialogical approach to public relations. Given that information and communication technologies and social media have reshaped all activities in modern society, the authors suggest improving the dialogue theory of public relations that can be achieved by considering dialogue between the organization and the public to identify important issues for further development.

Through online platforms, business organizations communicate with the general public and their users of products/services in a new environment called the sharing economy, in which users themselves participate in a certain way in communication. In the sharing economy, analyses of communications on web platforms show that companies communicate with the public about the quality of social trust relationships, as well as security and support (Knight, 2021).

New digital business solutions using artificial intelligence in the case of fashion technology start-ups for interpreting user style and wardrobe management include the role of a business ecosystem, product development tools, marketing campaigns, and PR channels (Ćwiklicki, Laurisz, & Mirzyńska, 2021).

PR activities can provide easier access to value creation processes among stakeholders in initiating positive social change. In addition, PR shapes institutional arrangements as well as public discourse and also provides platforms for recursive feedback loops of reflection to provide better service ecosystems. PR directs collective efforts through its understanding of stakeholder expressions to

provide a basis for collectively identifying problems and needed solutions (Fehrer, Baker, & Carroll, 2022).

CORPORATE SOCIAL RESPONSIBILITY

Conceptual definition of Corporate Social Responses

Kotler and Lee (2007, p. 3) define Corporate Social Responsibility as "*a commitment to improving the well-being of the community through discretionary business practices and contributing to the company's resources*". The key element of this definition is the word *discretionary*. The authors point out that the definition does not talk about business activities that are prescribed by law or by their nature moral or ethical, specifically and expected, but about the *voluntary* commitment of a company and the decision to choose and apply *discretionary* business practices to provide such contributions. (according to Bešić, & Đorđević, 2015, p. 56).

Within the concept of socially responsible business, companies integrate social interests and business effects according to the requirements of the natural environment and iteration towards business partners on a voluntary basis (Bešić, & Đorđević, 2015). Six social initiatives that operate in the field of corporate social responsibility are most often singled out: promotion of social goals, marketing related to social goals, corporate social marketing, corporate philanthropy, volunteer work for the community, socially responsible business practice (Đorđević, & Ćoćkalo, 2007).

According to Patel (2021), corporate social responsibility refers to work performed within and above the legal framework for the benefit of society. Terminological responsibility in business has moral obligations to society. In addition, corporate citizenship is associated with moral obligations in doing business with society. When it comes to an integral part of society, companies identify with individuals, so that their behavior is also guided by certain social norms.

Modern society is characterized by previously set principles that have taken their place in the management of total quality TQM or business philosophy that speaks of permanent improvement of the entire business of the organization. Combining technical, market, economic, organizational, and ethical business goals. The social aspect of improving the quality of business of a modern organization refers to the quality of life and well-being of the community (Bešić, & Đorđević, 2015). In Japan, back in 1990, they noticed that responsible business towards society reflects on the productivity of work and the productivity of the entire organization. By applying corporate social responsibility, a modern organization can achieve the goals of business excellence (Bešić, & Đorđević, 2015).

Standard ISO 26000

Social Responsibility is defined by the International Standard ISO 26000: 2010. This standard, unlike other standards, provides guidelines and not requirements and therefore cannot be certified. ISO 26000 provides explanations to understand social responsibility. In this way, it helps companies, organizations to direct the principles in the implementation of activities on the example of best practices of social responsibility in the global environment. The ISO 26000 standard is recommended for all types of organizations, different activities and the size of the organization, as well as their location. ISO 26000: 2010 contains a communication protocol that describes appropriate formulations to assist organizations in communicating their use of this standard. It is important to point out that the ISO 26000 documents are in line with the OECD for Multinational Enterprises and the United Nations Agenda 2030, ie the Sustainable Development Goals (ISO).

The improvements that are achieved in the organization by applying the ISO 26000 standard are the following: competitive advantage; reputation; ability to attract and retain employees, clients, customers; morale, commitment and productivity of employees; attitudes of investors, donors, owners, sponsorships and the financial community; relationship with companies, governments, media, business associates and the community where the organization operates (Portal Quality).

PUBLIC RELATIONS AND CORPORATE SOCIAL RESPONSIBILITY

Interconnection of business functions PR and CSR

Given that PR service as well as CSR belongs to top management and that PR communication relations improve the understanding of the organization and the public, there is a connection between these two business activities. The PR service identifies and anticipates changes in the environment that are related to the elements of social responsibility, and for these reasons, the importance of the connection of these business functions is growing. In consultation with experts from other fields, the PR service answers all questions regarding the organization's impact on the environment. Both business management functions, PR and CSR, have a strategic character, but the importance of PR is all the greater because it implements the principles of social responsibility (Nikolić, 2012).

Clark (2000) explains that PR and CSR have common goals in improving the quality of an organization's relationship with important stakeholder groups. The role of PR is to build quality communication that CSR does not recognize, but in synergy with the communication management that follows the political, social and historical environment, these two disciplines complement each other to make business decisions in building the companys' competitiveness.

The Relationship between PR and CSR

The interaction between consumer perception of CSR and corporate credibility was considered in a study in fashion industry companies. Based on a two-step model, before and after the crisis of corporate public relations, research has shown that consumers' perceptions of corporate responsibility have a significant impact on their guilt, which in turn negatively affects their perception of corporate social responsibility and credibility. However, the previous perception of consumers about socially responsible business and credibility plays an important role in regulating the end effects of the corporate PR crisis. In addition, CSR and corporate credibility go through a successive update mechanism (Souiden, Chaouali, Aldás-Manzano, & Rachid Jamali, 2022).

In Indian companies, CSR implementation is still low. Some managers and industrialists view CSR as a fashion statement or simply equate the term CSR with PR activities. Although most managers would like to, they still do not know how to establish, adopt CSR in their business if it is not within the legal framework (Patel, 2021).

Observed on the other hand, one of the examples showed that building a positive image of the company and commercialization of CSR was achieved by the role of PR in publishing CSR programs. In Indonesia, PT *Aqua Danone* is a *WASH* (*Water Access, Sanitation and Hygine*) study on water access, remediation and hygiene used PR methods and the 3P (*Planet, People, Profit*) concept of corporate social responsibility to confirm the role of PR in CSR, which resulted in a positive. PR activities in this case took place through the company's website, social networks and interviews in the mass media (Nugraheni, & Toni, 2022).

The results of a study conducted in Ghana, a developing country, showed that public relations has a key role in building and maintaining a corporate reputation, the reputation of the organization (Anani-Bossman, 2021). PR practitioners from multinational corporations, included in this research, have demonstrated a number of reputation building activities. Interpersonal communication, corporate social responsibility and community engagement stand out. In addition, it is important to point out that PR practitioners of the observed organizations fulfill their roles through developed strategies (Anani-Bossman, 2021).

From the aspect of management and marketing, Ji, Tao, and Rome, (2020) note that new opportunities for knowledge about socially responsible business and communication are on the rise. In addition,

corporate social responsibility is practically and theoretically very important in the field of communications.

Situation in the Republic of Serbia

Some managers of companies in Serbia expressed their views. Based on the results of the research, it was concluded that over time, work must be done to increase the level of organizational culture and public relations (Terek et al., 2011) in order to improve the business of domestic companies. According to the results of the research from 2017, sustainability reporting in companies in the Republic of Serbia is at a low level (Knežević et al., 2017). Given the compliance with the 2014 EU Directive and the guidelines of the *Global Reporting Initiative* (GRI) which improve and set more precise reporting requirements (Knežević et al., 2017), it is an opportunity for managers of domestic companies to understand the need for corporate reporting according to new concepts. In the context of corporate reputation of companies in Serbia, marketing activities and public relations significantly contribute to public perception. Considering the intensity of information and advertising in different ways from the aspect of marketing communications, media reporting and activities on the Internet are part of the companys' identity, so for these reasons it can be said that these activities affect the perception of public opinion. The communication channels set up in this way are essentially significant business activities that determine the companys' reputation (Vlastelica et al., 2017).

CONCLUSION

Information and communication technologies and digital media, as well as social networks, provide new opportunities for improving PR activities in two-way communication with the public. Practical PR solutions and communication channels give some support to CSR business, so it can be concluded that from the aspect of management, it is best to harmonize and perform these two business functions at the same time.

In the case of domestic companies of the Republic of Serbia, insufficient engagement of these management disciplines was noticed. First of all, public relations is usually more media-oriented in one-way communication, specifically in the case of publishing important information. Second, a low level of CSR representation in management can be observed. Perhaps the reasons should be sought in the lack of understanding of the need or insufficient education, in order to harmonize domestic business with international regulations, standards and guidelines, which would significantly improve both domestic business and the situation in society.

REFERENCES

Anani-Bossman, A. A. (2021). Role of Public Relations in Corporate Reputation Management: A Study of PR Practitioners in Selected Multinational Organisations in Ghana. *Corporate Reputation Review*, *24*(4), 222-233.

Bešić, C., & Đorđević, D. (2015). *Korporativna društvena odgovornost.* Čačak: Fakultet tehničkih nauka.

Chen, Y. R. R., Hung-Baesecke, C. J. F., & Chen, X. (2020). Moving forward the dialogic theory of public relations: Concepts, methods and applications of organization-public dialogue. *Public Relations Review*, *46*(1), 101878.

Clark, C. E. (2000). Differences between public relations and corporate social responsibility: An analysis. *Public relations review*, *26*(3), 363-380.

Ćwiklicki, M., Laurisz, N., & Mirzyńska, A. (2021). Case 7: Artificial Intelligence facilities customer experience. Example of Getdressed. *How to do business in digital era? Casebook*, 55.

Đorđević, D., & Bešić, C. (2005). *Odnosi s javnošću*. Zrenjanin: Tehnički fakultet „Mihajlo Pupin".

Đorđević, D., & Ćoćkalo, D. (2007). *Poslovna etika i pravo*. Zrenjanin: Tehnički fakultet „Mihajlo Pupin".

Fehrer, J.A., Baker, J.J. and Carroll, C.E. (2022). The role of public relations in shaping service ecosystems for social change. *Journal of Service Management*, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JOSM-01-2022-0044

Gordon, A. E. (2011). *Public Relations.* Oxford, New York: Oxford University Press.
ISO, ISO 26000 - Social responsibility, https://www.iso.org/iso-26000-social-responsibility.html, Datum posete: 16.04. 2022.
Ji, Y. G., Tao, W., & Rim, H. (2020). Mapping corporate social responsibility research in communication: A network and bibliometric analysis. *Public Relations Review*, *46*(5), 101963.
Knežević, G. R., Pavlović, V. D., & Stevanović, S. V. (2017). Izveštavanje o održivom razvoju–karakteristike, ograničenja i perspekiva u Republici Srbiji. *Poslovna ekonomija*, *11*(1).
Knight, A. M. (2021). *The Implications of The Sharing Economy for Public Relations Theory and Practice: A Thematic Analysis of Airbnb, Uber and TaskRabbit* (Doctoral dissertation, Virginia Tech).
Kotler, F., & Li, N. (2007). *Korporativna društvena odgovornost.* Beograd: Ekonomski fakultet, Čigoja.
Kriyantono, R., & Mckenna, B. (2017). Developing a culturally-relevant public relations theory for Indonesia. *Malaysian Journal of Communication*, *33*(1), 1-16.
Maloney, K., & McGrath, C. (2021). Rethinking public relations: Persuasion, democracy and society. *Public Relations Education*, *7*(1), 220-226.
Nikolić, M., & Terek, E. (2011). The analysis of the current state of organizational culture and public relations in Serbian companies. *Singidunum revija*, *8*(1), 207-215.
Nikolić, M., (2012). *Odnosi s javnošću*. Zrenjanin: Tehnički fakultet „Mihajlo Pupin".
Nugraheni, A., & Toni, A. (2022). Peran Public Relation Dalam CSR "Program WASH" PT Aqua Danone Indonesia. *Jurnal Pustaka Komunikasi*, *5*(1), 106-120.
Patel, P. C. (2021). CSR Practices in India: The case study on CSR initiatives taken by TATA Group. *Management & Industry 4.0, NHRG,* p.p. 142-155.
Pieczka, M. (2019). Looking back and going forward: The concept of the public in public relations theory. *Public Relations Inquiry*, *8*(3), 225-244.
Portal Kvalitet, Dostupno na: https://www.kvalitet.org.rs/infrastruktura/standardi/iso-26000, Datum posete: 20.04.2022.
Souiden, N., Chaouali, W., Aldás-Manzano, J., & Rachid Jamali, D. (2022). Blame and culpability in explaining changes in perceptions of corporate social responsibility and credibility. *Business Ethics, the Environment & Responsibility*, *31*(2), 363-385.
Vlastelica, T., Kostić-Stanković, M., & Cicvarić-Kostić, S. (2017). Conceptual approach to corporate reputation modeling. *Marketing*, *48*(3), 155-160.
Wojcik, K. (2021). Wizerunek i reputacja organizacji: informacyjny i zarządczy potencjał–część I. *Studia Medioznawcze*, *22*(4), 1061-1076.
Yang, A., & Saffer, A. J. (2019). Embracing a network perspective in the network society: The dawn of a new paradigm in strategic public relations. *Public Relations Review*, *45*(4), 101843.

THE ROLE OF SOCIAL MEDIA IN THE DECISION-MAKING PROCESS

Srđana Taboroši
University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia
E-mail: srdana.taborosi@gmail.com
Aleksandra Kovačević
University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia
Biljana Maljugić
University of Novi Sad, Technical faculty "Mihajlo Pupin", Zrenjanin, Serbia

ABSTRACT

In this paper, the authors define the theoretical connections between social networks and decision-making processes. Social networks have become a common part of everyday life, and all segments of society in some way participate in communication with peers using some of these platforms. As the way and channel of communication have changed, so have social networks strongly influenced the redesign of the way of thinking and creating opinions in the population. Shared opinions on something in the population can have a significant impact on the decision-making process within the company. With an adequate analysis of the attitudes of the population on social networks, the company can react in a timely manner and improve business and using the same communication channels, a certain decision within the company can be better approached and explained to users, thus reducing resistance to changes that may occur in consumers. Social networks have a multidimensional influence in the decision-making process and it is important to use their potential properly to improve business and improve competitiveness, especially in times of crisis.

Key words: Decision-making, Social networks, Customer participation, Choice.

INTRODUCTION

Many things can influence the decision-making process of people, including the media, information technology, the way of communication, as well as new media or social networks, which are a kind of unified tool that encompasses all of the above. The way of communication and access to information has changed a lot in recent years with the development of social networks and the growth of their popularity among the population. According to Kaplan and Haenlein (2010), social networks are a set of applications that allow users to create and share content. Almost every segment of the population today has the opportunity to use one of the platforms by sharing, creating or consuming content, and their diversity depends on the platform itself, thus forming generational or professional segments in the population. Kaplan and Haelein (2010) define six different types of social media: blogs, content communities, collaborative projects, social networking sites, virtual social worlds, and virtual game worlds. From then until today, social networks have evolved, changed, disappeared and new ones were created, but their influence on people has not weakened, but on the contrary, they have become part of everyday life, their influence has expanded and deepened, and is expected of every company today, no matter what they do professionally, to have and actively use social media to communicate with its consumers.

The spread and deepening of the influence of social media on the population have led to changes in the way of communication and channels for it. In addition to company-customer communication, communication among employees within the company has also changed, as well as in the general case population (Power and Phillips-Wren, 2011). According to the same authors, social networks strongly alter opinions and influence the decisions and choices of both consumers and management. The

connectedness of the world's population has never been so strong, and this is achieved precisely because of information technologies and social networks. This population connection leads to the development of crow behavior, conformity, peer pressure, and communication saturation; very influential forms of human behavior that extend to all aspects of life as well as business. The authors of this paper provide a theoretical basis on the impact of social networks on decision making and recommendations for further research to improve business processes and results.

SOCIAL MEDIA AND ITS INFLUENCE

The use of social networks in people evokes various emotions, from friendship and support to disagreement and aggression. People's behavior and the type of influence of social networks can to some extent be predicted depending on the type of social networks as well as the segment that makes up their users (Leskovec, Huttenlocher and Kleinberg, 2010). Different social networks have different degrees of influence on different populations. Thus, Gilani, Salimi, Jouyandeh, Tavasoli and Wong (2019) through a meta-analysis of 412 scientific papers combine the influences of social networks, where they show that the influence exists in the areas of:

- marketing
- tourism
- environment
- professional health
- mental health and emotions
- anti-vaccination
- policy and government
- IT
- crisis and disaster management
- organizations and enterprises.

When it comes to the impact of social networks, it must be taken into account that they work according to certain algorithms, and are not simple platforms where users create all available content that is equally visible. Successful social media companies, such as Facebook, have also been associated with controversies where information flows have been manipulated to increase the impact on users' emotions (Kleinsman and Buckley, 2015). This is a danger of social networks because depending on the interests that the company supports, the impact on the population can be positive or negative, and companies and management are not in a position to properly influence that impact. Precisely because of this, upper management must be aware of the overall impact in order to develop the right mechanisms to manage these consequences, both among employees at their level and among subordinates.

The impact of social networks on certain areas can be expected, especially in the field of marketing. This influence can be easily noticed through trends in fashion and tourism, as well as in other socio-economic and political spheres. However, the influence of social networks on the decision-making process has not been sufficiently researched, although it should not be neglected. It is important to introduce such a subtle influence into decision-making methods so that all potential dangers in modern business can be managed properly, taking into account that the influence of social networks continues to deepen and trends show that growth will continue especially through meta-universe technologies.

DECISION-MAKING METHODS

Professionals are faced, in many business situations, with using some of the decision-making methods to choose the most optimal solutions for the position they are in or the problem they are trying to solve. These methods differ depending on the problems they solve, but also the expertise and personal preferences of the person who performs this job. But all methods have established matrixes by which

they work, so whether professionals opt for the Technique for Order of Preference by Similarity to Ideal Solution, Analytical Hierarchy Process, or Data Envelopment Analysis, the process of these tools is clear (Liu, Eckert and Earl, 2020) . By defining multipe criteria, a certain intensity of their influence on the result is estimated, and the optimal result is chosen. As the intensity of the impact of the criteria is assessed based on the opinion of experts, the weakness of such methods can be noticed, because experts must have a highly developed social intelligence in order to be aware of their own subjectivity in this process.

According to Mardani, Jusoh and Zavadskas (2015), the Analytical Hierarchy Process or AHP is one of the most commonly used tools in the decision-making process. This method defines the problem through a hierarchy in descending order from goal to criteria and sub-criteria (Saati, 1990), and in this way method enables the perception of connections and facilitates the understanding of the elements. Then these elements are scored on a 9 level scale according to the strength of their influence. It is in this process of assigning value to the elements on the scale that an error can occur, both due to the imperfection of the method and due to certain influences to which the experts who participate in the whole process are subject. In this paper, the authors try to look at the often-neglected impact of social media on employees and the whole decision-making process.

DECISION-MAKING IN SOCIAL MEDIA ENVIRONMENT

Social perception, clarity of the message, as well as the ability of the message tend to influence the quality of decision making (Daft and Lengel, 1984). Social media as a tool can significantly change the way the population perceives certain information precisely because of its mass, as well as the segmentation that certain networks allow because they provide "grouped" users based on their preferences (Facebook and LinkedIn groups, etc.). Being surrounded by people who perceive reality very similar, even virtually, can disrupt objectivity and criticism in the decision-making process, which can have negative consequences in some cases. Social networks through user segmentation can also affect the ability of users to understand a particular message in the right way because an altered ability to perceive can also lead to miscommunications. This can also happen due to the impossibility to convey the message clearly, because virtual space, although it has its advantages, also has its limitations, and thus there can be an insufficient quality of communication due to media limitations. All these influences can act harmlessly when it comes to everyday life, but they can negatively affect consumers, and also employees and management, so mistakes can occur that can more or less endanger business.

According to Kahai and Cooper (2003), the quality of the decision made also depends on the expertise of the user. In the social media environment, it is not possible to control what information is distributed to certain users and in what way, so their influence cannot be controlled. In addition, a kind of peer pressure is created, as a group influences an individual to correct or change their attitudes, values, or behavior in order to be in line with the group with which they identify. This phenomenon can have a very strong influence on decision-making, because due to conformism, the person who makes the decision turns to his environment in this process, and due to the desire to be accepted and loved by their environment, they may succumb to pressure. According to Aronson, Wilson, and Ackert (2007), conformity largely occurs on social media.

According to Power and Phillips-Wren (2010), information saturation can be another strong influence of social networks on the decision-making process. Information saturation is considered to be an overload of communication, which is very common on social networks, because users spend a lot of time using these platforms. Users are burdened by the number of channels or accounts that are placed as well as the amount of information in their social media environment. This diminishes their perception and critical thinking and thus leads to a changed decision-making process.

Some research finds that social media can significantly influence individual decisions, but also decisions within an organization. According to Kirkpatrick (2011), social media was the main initiator

of the "Arab Spring", and the influence of social networks on the presidential elections in the United States, as well as on the protests in Hong Kong (Frosina, 2021), has been talked about for a long time. As it is possible to notice such significant influences, there is no doubt that similar ones exist within the companies.

According to Bulmer and DiMauro (2011), information technology and social media have changed business in general, and the new model of online engagement has created a strong impact on the decision-making process of the CEOs and managers. The same authors define several key influences of social media on the decision-making process in employees:

- For the purpose of improving business, employees belong to several groups of social networks
- Facebook, Twitter, and LinkedIn have emerged as the dominant business social networks
- The mobile phone has become the most important tool for accessing networks
- The current traditional decision-making process is disturbed due to social networks
- Professional networks have become a very important decision support tool
- Employees have a high level of trust in the information they receive through social media
- Peer input is necessary in the decision-making process
- Employees in multiple social networks are more likely to use these tools to gather information in the early stages of the decision-making process, and this is especially true for young people.

CONCLUSION

The influence of social networks on all aspects of society is growing and deepening as they develop. Social media has come a long way from platforms where children and youngsters play games to professional job-finding networks. Along the way, their influence grew and deepened, especially in the business sector. Influencing the way people think can also disrupt the decision-making process. What is worrying is that this influence continues to grow, and although it can be positive and negative for employees and the company, it must not be neglected, but properly recognized and used to make the business progress. By using social networks, the company has the opportunity to positively influence its consumers and develop communication with them. However, the impact of social networks on top management must be properly managed. Experts involved in the decision-making process must be aware of this impact and properly manage it both within themselves in forming opinions and attitudes, and in their professional activities. There is a need for deeper research into how social networks can negatively influence decision-makers, as such research is lacking. The influence of social networks needs to be introduced into the calculations of decision-making methods in certain activities in order to modernize this process.

REFERENCES

Aronson, E., Wilson, T.D., & Akert, A.M. (2007). *Social Psychology. 6th Ed.* Upper Saddle River, NJ: Pearson Prentice Hall.

Bulmer, D. & DiMauro, V. (2011). 2nd Annual New Symbiosis of Professional Networks study. Available at http://dssresources.com/news/3255.php accesed 12.4.2022.

Daft, R.L. & Lengel R.H. (1984). Information richness: a new approach to managerial behavior and organizational design. *Research in Organizational Behavior. Cummings L.L. and Staw B.M. (Eds.), Vol. 6*. Homewood, IL: JAI Press, 1984, p. 191-233.

Frosina, K. (2021). Digital revolution: How Social Media Shaped the 2019 Hong Kong Protests. Available at: https://www.ispionline.it/en/pubblicazione/digital-revolution-how-social-media-shaped-2019-hong-kong-protests-30756 accesed on 25.3.2022.

Gilani, E., Salimi, D., Jouyandeh, M., Tavasoli, K & Wong, W. (2019). A trend study on the impact of social media in decision making. *International Journal of Data and Network Science*, 3(3), 201-222.

Kahai, S. & Cooper, R. (2003). Exploring the Core Concepts of Media Richness Theory: The Impact of Cue Multiplicity and Feedback Immediacy on Decision Quality. *Journal of Management Information Systems.* 20(1), 263-299.

Kaplan, A.M. & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, 53(1), 59-68.

Kirkpatrick, D. (2011). Wired and Shrewd, Young Egyptians Guide Revolt. *The New York Times*, February 9, 2011. Available at: https://www.nytimes.com/2011/02/10/world/middleeast/10youth.html accesed on 28.4.2022.

Kleinsman, J. & Buckley, S. (2015). Facebook study: a little bit unethical but worth it?. *Journal of Bioethical Inquiry*, 12(2), 179–182.

Leskovec, J., Huttenlocher, D. & Kleinberg, J. (2010). Predicting positive and negative links in online social networks. In Proceedings of the *19th international conference on World wide web* (WWW '10). New York, NY: Association for Computing Machinery, 641–650.

Liu, Y., Eckert, C.M. & Earl, C. (2020). A review of fuzzy AHP methods for decision-making with subjective judgements. *Expert Systems with Applications*, 161, 113738–.

Mardani, A., Jusoh, A. & Zavadskas, E. K. (2015). Fuzzy multiple criteria decision-making techniques and applications – Two decades review from 1994 to 2014. *Expert Systems with Applications*, 42, 4126-4148.

Saaty, T. L. (1990). How to make a decision: the analytic hierarchy process. *European journal of operational research*, 48, 9-26.

GAMBLING MARKETING COMMUNICATION

Bruno Završnik
University of Maribor, Faculty of Economics and Business, Slovenia
E-mail: bruno.zavrsnik@um.si

ABSTRACT

Nowadays, companies must very well know their customers and dedicate them to a lot of attention to achieving their satisfaction. Only satisfied customers who return to the same organization each time, the goal of achieving the potential profit can be met. This is especially true in the field of gambling, as players must always have several information with which they help to decide on gambling. The aim of the survey was to find out how often gamblers play, which activities of gambling providers persuade them the most to participate in gambling and which factors are most influential for gambling. Research has shown that most information is given to the participants of gambling on TV ads and social networks.

Key words: Gambling, Marketing communication, Customer satisfaction.

INTRODUCTION

Although it would be ideal from the viewpoint of gambling businesses if all customers could be satisfied, this is not possible; thus marketers tend to choose the most profitable customers to market their product to. The gambling industry has always used various inducements, techniques, and ploys to attract new custom and to encourage people to gamble. An analysis of these methods shows that they fall mainly into two categories. These are situational and structural characteristics. Situational characteristics are those characteristics that induce people to gamble in the first place. These characteristics are primarily features of the environment and can be considered the situational determinants of gambling. They include such things as the location of the gambling outlet, the number of gambling outlets in a specified area and the use of advertising in stimulating people to gamble. (Zangeneh, Griffiths & Parke 2008)

Gambling advertising and marketing activity has a wide reach, encompassing existing gamblers but also lapsed/non-gamblers who may be encouraged to start or restart gambling. With gambling operators' marketing across a range of media, from TV ads to sports team sponsorships, to social media, there is a question about appreciating better the cumulative impact of all this activity on consumers. The effects of gambling advertising may have been potentially exacerbated by the pandemic, where many people have been at home more, watching more live TV, spending more time online and on social media, and have seen their financial circumstances change. (Gambling Commission 2021)

GAMBLING

In gambling, participants have the same chance of winning prizes to pay a certain amount, and the outcome of the game depends exclusively or predominantly on chance or some uncertain event. We divide them into classic gambling and special gambling.

The organization of gambling is an exclusive right of the Republic of Slovenia, which may be organized only based on a permit or concession from the competent authority. The gaming device with which they are arranged must comply with the prescribed technical and other requirements and have

the permission of the supervisory authority for use. The use and installation of gaming devices with simulations of gambling or games in which a payable is used to pay for an individual game and to determine the prize or winnings is allowed only to organizers who have a concession to organize gambling. (Finančna Uprava 2021)

Gambling has been a part of humanity for a long time, and references to it have been found in some of the earliest dated records. Literature on the topic has been accumulating since ancient times. The advent of Internet technology along with its typical subsets provides a new approach to how gambling is conducted in postmodern times. (Ozuem & Prasad 2015)

Changes in the media landscape in recent years have fundamentally altered gambling marketing practice. Consumers can now gamble in real-time and from almost any location. Contemporary gambling marketing now represents a multi-layered mix of mass media advertising (e.g., television), consumer marketing (e.g., price offers) and subtle marketing (e.g., sponsorship). Advertising is a key component of gambling marketing, and recent easing of restrictions has seen a proliferation of gambling advertising in many countries. There is a need to examine recent evidence on the nature of this advertising and its potential effects. (Newall, Moodie, Reith et al 2019)

The internet has changed the way in which we communicate with each other and entertain ourselves. The gambling sector was an early adopter of online innovation. One of the major developments has been the proliferation of social media, the communities and networks that enable the sharing of content between groups of people.

Digital gambling marketing is broad, ranging from the marketing of online gambling websites to communication and advertising on the social media and networks. Social networks are considered to amount to a set of applications with various operating modes and uses general networking (Facebook, MySpace), micro-blogging (Twitter), photo sharing, or exchange of ephemeral content (Instagram, Snapchat, etc.). These companies broadcast messages directly by insertion of classic advertisements into Internet users' news feeds, into stories, in the animation of official pages via community managers (Facebook, Instagram), and in the creation of cultural, sporting, or festive events associated with the brand. (Guillou-Landréat et.al 2021) Gambling companies have embraced social media as a means of communicating with potential customers. (James & Bradley 2021)

EMPIRICAL FINDINGS

The survey was published online using the 1ka program. We shared the link to the survey via e-mail and distributed it to various groups on Facebook. We first excluded from the analysis those who do not gambling. The total number of respondents for carrying out a market survey was 100 of this, 58 were men and 42 were women.
We first obtained data on the age structure of the respondents (Table 1).

Table 1: Age of the respondents

Age (Years)	Frequency	Percent
18 - 30	42	42%
31 - 50	44	44%
51- 60	12	12%
61 and more	2	2%
Total	100	100%

In the next question, we were interested in the current status of the respondents (Table 2). More than half of them described their status as "Employed". There were as many as 63% of them. The next largest group are students 28%, followed by the unemployed 6% and retirees 3%.

Table 2: Status of the respondents

Status	Frequency	Percent
Employed	63	63%
Student	28	28%
Unemployed	6	6%
Retirees	3	3%
Total	100	100%

We were also interested in the net monthly income of the respondents (Table 3). Most respondents chose the category from € 1,000 to € 2,000 (49%), followed by the category from € 500 to € 1,000 (40%). 10% of respondents indicated an answer of up to € 500 and 1% more than € 2,000.

Table 3: Net monthly income of the respondents

Net monthly income	Frequency	Percent
To 500 euros	10	10%
From € 500 to € 1000	40	40%
From € 1000 to € 2000	49	49%
More than 2000 euros	1	1%
Total	100	100%

In the next question, we were interested in the ways of paying for gambling, namely whether it is online or at points of sale (Table 4).

Table 4: Ways to pay for gambling

Net monthly income	Frequency	Percent
At point of sale (Petrol station, Pošta Slovenije and Trafika 3dva)	46	46%
Specialized Lottery stores	39	39%
Online sales	15	15%
Total	100	100%

Most respondents pay for gambling at points of sale such as petrol stations, Pošta Slovenije and Trafike 3dva, 40% of them, followed by specialized Lottery stores in Slovenia with 40% and finally online sales with 15%.

When asked about the frequency of gambling, respondents answered the following. 43% of respondents gambling once a month. It is followed by 22% of respondents with the answer once a week, 16% with half a year 10% with more than once a week", 7% with once a year and 2% of respondents with every day (Table 5).

Table 5: The frequency of gambling

Frequency of gambling	Frequency	Percent
Once a year	7	7%
Half a year	16	16%
Once a month	43	43%
Once a week	22	22%
More than once a week	10	10%
Everyday	2	2%
Total	100	100%

In the next question, we were interested in what is most often reason for play gambling (Table 6). In the first place, the expected answer is that 53% of respondents answered the amount of funds. This is followed by sales promotions with 24% of respondents, TV or radio Ads with 8%, sales staff with 6%, Facebook 4%, Ads in print media with 4% and 1% as the second (random).

Table 6: Factors influence the decision to gamble

Factors of influence	Frequency	Percent
The amount of funds	53	53%
Sales promotions	24	24%
TV or Radio Ads	8	8%
Sales staff	6	4%
Facebook	4	4%
Ads in the print media	4	4%
Other	1	1%
Total	100	100%

With the next question, we focused more on advertising as part of marketing communication (Table 7). We found that ads on social networks (38%) attract the most attention, followed by TV ads (32%), posters at points of sale (14%), radio ads (10%), ads on the website of gambling providers (5%) and 1% of respondents chose the answer "other", citing television commercials and posters at the same time.

Table 7: Obtaining information about gambling

Sources of information	Frequency	Percent
Social networks	38	38%
TV	32	32%
Posters at points of sale	14	14%
Radio	10	10%
Gambling Provider Websites	5	5%
Other	1	1%
Total	100	100%

We were also interested in how satisfied the respondents were with the individual elements of gambling providers. We used the Likert scale from 1 to 5, where 1 means "I am completely dissatisfied" and 5 "I am completely satisfied"(Table 8).

Table 8: Satisfaction with individual elements of gambling providers

Statement	Satisfaction with the element of gambling providers				
	Very satisfied	Satisfied	Undecided	Dissatisfied	Very dissatisfied
The amount of funds	6	29	13	31	21
Gifts given	1	32	22	29	16
Variety of gambling	2	40	24	27	7
Sales promotions	13	51	14	18	6
Number of draws	4	63	16	15	2
Staff friendliness	18	63	12	5	2
Communication of gambling providers with the public	2	50	33	14	1
Possibility to pay online	21	53	17	7	2
Interesting ads	3	51	34	9	3
Availability of gambling	32	52	9	6	1

The highest level of satisfaction was with the Availability of gambling, with an overall level of satisfaction expressed by 84% of respondents, 9% were neither satisfied nor dissatisfied, 7% were dissatisfied. It is followed by "Staff friendliness", with 81% of respondents satisfied (18% chose "I am completely satisfied" and 62% "Satisfied"), 12% were undecided, 7% were totally dissatisfied.

A total of 74% of respondents were satisfied with the possibility of online payments, 17% were undecided and 9% were dissatisfied. They are followed by the number of draws per week with a total satisfaction of 67% of respondents, 16% undecided, 17% were dissatisfied. 62% of respondents

expressed overall satisfaction with sales promotions such as a donated lottery ticket or a donated car, 14% undecided and 24% of respondents were dissatisfied. They are followed by interesting ads with a total satisfaction of 54%, 34% of respondents were undecided, 12% dissatisfied and then the communication of gambling providers with the public satisfaction expressed by 52% of respondents, 33% undecided and 15% dissatisfied. 42% of respondents expressed satisfaction with the variety of gambling, 24% were undecided, 34% dissatisfied, while 35% of respondents expressed satisfaction with the amount of funds, 13% were undecided and 52% dissatisfied. Respondents expressed the lowest level of satisfaction with the gifts given, namely 33% were jointly satisfied, 22% undecided and 45% dissatisfied.

CONCLUSION

With the research we wanted to find out what experience gamblers have with gambling providers. We were also interested in the role of marketing communication in informing gamblers. Most customers have played an important role in advertising, as they have learned about all the innovations that gambling providers are introducing to the market. However, these innovations are practically a necessary part of everyday life, as customers are becoming more and more demanding and meeting their needs is becoming increasingly difficult.

In the field of sales promotion, some gambling providers often introduce a donated lottery ticket, increase the possibility of a car prize in the Lotto draw, and receive an additional draw card at the Eurojackpot game. In doing so, they not only increase the satisfaction of their customers, but they also increase the sales of these products.

REFERENCES

Finančna uprava. (2021). https://www.fu.gov.si/drugo/posebna_podrocja/igre_na_sreco/#c1914

Gambling Commission. (2021). https://www.gamblingcommission.gov.uk/statistics-and-research/publication/understanding-how-consumers-engaged-with-gambling-advertising-in-2020

Guillou-Landréat M., Gallopel-Morvan, K., Lever, D. Le Goff, Le Reste, J.Y. (2021). Gambling Marketing Strategies and the Internet: What Do We Know? A Systematic Review. Frontiers in Psychiatry, Frontiers, 12, 10.3

James, R.J.E., Bradley, A. (2021). The Use of Social Media in Research on Gambling: a Systematic Review. *Curr Addict Rep* **8,** 235–245. https://doi.org/10.1007/s40429-021-00364-w.

Newall, P.W.S., Moodie, C., Reith, G. *et al.* (2019). Gambling Marketing from 2014 to 2018: a Literature Review. *Curr Addict Rep* **6,** 49–56. https://doi.org/10.1007/s40429-019-00239-1

Ozuem, W., & Prasad, J. (2015). Online Social Gambling and Its Implications for the Study of Marketing Communications. *International Journal of Applied Behavioral Economics (IJABE), 4*(3), 22-50. http://doi.org/10.4018/IJABE.2015070102

Zangeneh, M., Griffiths, M., Parke, J. (2008). The Marketing of Gambling. In: Zangeneh, M., Blaszczynski, A., Turner, N.E. (eds) In the Pursuit of Winning. Springer, Boston, MA.

Session D: ECONOMY

Papers (pp. 199-264):

THE ROLE OF PRODUCTIVITY IN ACHIEVING COMPETITIVENESS

Mihalj Bakator
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
E-mail: mihalj.bakator@uns.ac.rs
Dejan Đorđević
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
Dragan Ćoćkalo
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia
Srđan Bogetić
Belgrade Academy of Business and Art Studies, Republic of Serbia
Sanja Stanisavljev
University of Novi Sad, Technical Faculty "Mihajlo Pupin" in Zrenjanin, Republic of Serbia

ABSTRACT

The global economy and the new conditions of conducting business brought challenges to companies across industries. The creation of competitive advantage intensifies the struggles of companies on the globalized market. The modern business environment is heavily affected by the coronavirus pandemic, by the fourth industrial revolution - Industry 4.0, and the growing importance of sustainability and the accompanying sustainable development goals. In this paper the role of productivity for achieving competitiveness of domestic companies is analyzed. The main goal of the paper is to provide an overview on how productivity takes its role in increasing competitive ability of companies amidst the dynamic changes that define the modern business environment. Based on the analysis of literature and data in this domain, suggestions and guidelines for improving competitiveness of domestic enterprises. The paper provides a solid basis for future research.

Key words: Globalization, Competitiveness, Quality, Productivity, Knowledge.

INTRODUCTION

The globalization of economic processes and technological development, are the cornerstone of the modern economy. Because of this process, the economy becomes global and competition intensifies. Globalization views the world as a single market in which the most efficient and competitive will thrive. The world is economically interactive and interdependent. Competition in most industries has become internationalized and companies are entering the market through global strategies. Continuously, the global competitive situation becomes more complicated, and competitive relations between enterprises intensify (Bakator et al., 2019).

Further, the modern economy is determined by new competitive conditions. According to Kotler and Caslione (2009), the global economy is characterized by the emergence of hyper-competition. Hyper-competition occurs when technologies and supply are so new that standards and rules are fluid that causes competitive advances that are impossible to stop. It is characterized by intense and fast competitive shifts between competitors on the market.

Further, the global crisis caused by the COVID-19 pandemic has highlighted the need to change the modern business philosophy. The global economy has shown all its instability, and business in the conditions of a pandemic has reduced the volume of global trade. Some business sectors, such as tourism, have collapsed. The economic crisis caused by the global pandemic has shown how connected the global world is. According to some estimates (Bešić, & Đorđević 2020), the global market and the establishment of new competitive relations require a new approach in managing a business organization, which means continuous innovation not only of products and services, but also of full-fledged business processes. The

success of the organization's business can be achieved only by improving the productivity of all key business resources and improving the existing level of innovation. All the newly industrialized economies of the world, China in particular, have based their development on the constant growth of business productivity, while achieving an acceptable level of quality (Shen et al., 2020). The main problem of domestic companies is non-competitiveness that occurs due to poor business productivity, lack of application of new technologies and knowledge, and inadequate application of quality management. The low level of technological equipment of domestic companies, high business costs, as well as the inefficiency of business systems are just some of the problems that domestic companies face.

In this paper, key factors that define the modern business environment and the important role of productivity in achieving competitiveness is analysed. The main goal is to provide an overview on how productivity can increase and help develop a competitive advantage on the globalized market. The paper consists of three main sections (excluding the Introduction and Conclusion sections). The first section addresses key factors of modern business, which forms the new business paradigm. The second section addresses productivity in the Republic of Serbia. Finally, the third section discusses suggestions and guidelines for improving productivity and competitiveness of domestic enterprises.

KEY FACTORS OF MODERN BUSINESS

The global economy emphasizes business based on innovation, improving productivity, improving quality, and improving knowledge. Drucker believes (1995) that the basic roadmaps in an entrepreneurial economy must be productivity and innovation. Innovation in modern business is a factor of competitiveness. The research and development function, focused on the continuous improvement of the product quality concept, is the basic source of future growth and development of the company. Research and development should be related to marketing, because the focus of modern business processes are the users, which means that the analysis of their requirements is the starting point, and the analysis of their satisfaction is the final point of the marketing process. Business excellence is the main goal of modern business. Business excellence results in a competitive leadership position. Business excellence means that companies are constantly working on the process of implementing quality and increasing the productivity and knowledge of each employee. Business excellence can be achieved in two ways: by applying the concept of total quality management (TQM) and by applying integrated management systems (IMS).

Productivity is an imperative of modern business and probably the most important factor of competitiveness in the global market. Economic history since the beginning of the industrial revolution has been marked by the need to improve labour productivity. According to some findings (Bešić, & Đorđević 2017), productivity is the most important factor of competitiveness in modern business. The struggle for consumers and for stable market participation is essentially a struggle to increase business productivity.

The global economy has directly influenced the development of competitive relations in the global market. New competitors have emerged in the global market, coming from the so-called. "Newly industrialized countries", such as China, India, Brazil, South Africa, etc. Business organizations coming from these countries are becoming competitive with companies from the most developed countries. It is considered that (Bešić, & Đorđević 2019) companies coming from newly industrialized countries base their competitiveness on lower business costs, which directly affect the improvement of their productivity, standardized business models, use of modern technological achievements and optimization of price and quality. In essence, companies from newly industrialized countries combine the effects of continuous improvement of business productivity, with a focus on reducing costs, with modern achievements in the field of management and technology. In modern business, quality is one of the main factors in achieving the competitiveness on the globalized market. Quality is inextricably linked to productivity. It is considered (Bešić, & Đorđević, 2019) that quality viewed exclusively as a management concept. Quality implies building a certain model of quality management into the organizational structure (Popović, 2021). The most important factors that influenced the improvement of the concept in practical and theoretical terms were: increasing productivity, development of innovative activities, globalization of the market and the need to achieve consumer satisfaction.

In modern business conditions in the process of organization management, business functions stand out, which due to their market orientation have strategic importance. These business functions are marketing, quality management, and research and development (Đorđević, & Ćoćkalo, 2010). Innovation is the result of action, marketing, and research and development. Quality is a management phenomenon and focuses on meeting the requirements and expectations of customers. Quality management should result in improved business productivity and customer satisfaction. Marketing and quality begin with consumers' and customers' demands, and end with the analysis of customer and user satisfaction. Modern economy is the economy of knowledge. According to some considerations (Krebs, 2007), today we live in a knowledge economy, in which knowledge is power, but only if it is a process of connecting knowledge. The knowledge economy is based on connection complexity. They are all interconnected in a single economic system. The modern economy is the information economy, which is driven by economic networks, as opposed to the industrial economy, which is outdated and which was driven by economies of scale.

In the 21st century, knowledge is treated as operational knowledge that enables the improvement of other activities, increasing business productivity, and creating an organization that uses knowledge in its business to become competitive. Knowledge management is a systematic approach to finding ways to make the best use of and implement knowledge in an organization. Its goal is to maintain sustainable competitiveness or plan long-term business policy. From the aspect of managers, knowledge management can be seen as a process for optimizing the effective use of intellectual capital to achieve the goals of the organization. The task of a modern organization is to improve the knowledge of its employees because this further improves business productivity. In an organization that can be defined as a learning organization, all employees are responsible for personal development. Modern organizations need to be knowledge-intensive. Some of the characteristics of the learning organization are the development of organization knowledge, spreading knowledge in a hierarchical vertical, but also horizontally, commitment to improving knowledge, commitment to knowledge as the most important business resource, competitiveness is achieved by increasing knowledge productivity.

ANALYZING PRODUCTIVITY ASPECTS IN ENTERPRISES IN THE REPUBLIC OF SERBIA

The problem of non-competitiveness of domestic companies is primarily related to low productivity of domestic companies. The productivity of domestic companies is unsatisfactory. It is believed that the productivity of domestic companies is three times lower than the EU average. Outdated equipment, high business costs, inefficient organization and inadequate application of modern management methods and techniques directly affect the problem of productivity of domestic companies.

According to the data of the Republic Bureau of Statistics (RZS, 2020), the productivity of the domestic economy in the period between 2015 and 2019 increased by 14%. This is twice the GDP growth than employment growth (18.3%). Only large companies had above average productivity in the observed period, in 2019 medium-sized companies joined large companies. Resource productivity, as the ratio between GDP and domestic consumption of materials in 2019, amounted to 39.2 dinars per kilogram, which is 2.15% less compared to 2018.

The key problem of inadequate productivity of domestic companies is the age of manufacturing equipment. Serbia has been lagging behind the European average for many years, when it comes to manufacturing equipment age. Domestic entrepreneurs (private individuals) mostly buy repaired equipment abroad, which is functional, but technologically lagging behind. The average age of equipment in domestic companies is between 20 and 30 years. On the other hand, domestic managers do not sufficiently apply modern management methods and techniques, and production takes place on outdated equipment.

It is considered that one of the biggest structural problems of the domestic economy (RZS, 2020) is the slow change of technological structure of the processing industry. In the period between 2015 and 2019, in the domain of manufacturing companies, the majority of companies had low and medium technological

complexity in their manufacturing and technological processes. In 2019, 43% of companies were in the field of low technological complexity, 28% of companies were in the field of medium-low technological complexity, 22.6% of companies were in the field of medium-high technological complexity and only 5.5% of companies has fallen into the realm of high technological complexity. If we take into account the first and second groups of companies, then over 70% of companies have medium and low technological intensity.

The largest number of fixed investments on the domestic market is directed towards labour-intensive activities. These investments are focused on the construction of facilities and plants, as well as equipment, while investments in new equipment and technology are minimal. Thus, there is an increase in employment at the level of the economy. However, there is no real increase in business productivity, because it is directly related to the application of high-tech solutions and new industrial equipment. Some of the consequences of low productivity of domestic companies, besides the non-competitiveness on a global scale, are an underdeveloped economy, falling consumption, growing foreign trade deficit, etc.

Increase in productivity is often determined by several main factors including production process management and organization, product specialization, investments in human capital, scientific progress, technological progress and innovation (Skapars et al., 2017). In the future productivity will be characterized by striving towards organizational areas, continual upgrades of production cycles, automation and information application in production processes, information and technology workflow improvements, team-based design and concurrent engineering, and effective new product development processes (Fragapane, 2022).

SUGGESTIONS FOR PRODUCTIVITY IMPROVEMENT IN DOMESTIC ENTERPRISES

A 1% increase in productivity is thought to lead to a 1% increase in GDP (WBG 2019). More productive organizations and the ones that implements the best psychological practices have a better chance of competing on a global level. On the other hand, quality and productivity are inextricably linked - when quality is improved, productivity is also improved. The domestic economy has been in the process of economic transition for over twenty years, which has led to the negative effects of the transitional recession. These effects are multiplied by the negative effects of the global economic crisis of 2008. In addition, serious consequences for the national economy are still expected as a result of the crisis due to the global pandemic. Domestic companies struggled to maintain a minimum cooperativeness in conducting business in the face of a chronic shortage of funds. There was not enough money to buy new equipment, as well as to invest in new management methods and techniques. As quality and productivity are interrelated, it is evident that due to the bad financial situation, domestic companies could not invest adequate financial resources in equipment or in the implementation of the quality concept, and those who invested in quality were pressured by foreign partners.

Continuous improvement of business processes is achieved through implementing the concept of quality management, and quality itself is one of the most important elements of competition in global market conditions. The following guidelines for improving business processes are proposed:

- Quality must be applied as a management concept that permeates the entire organizational structure and is focused on productivity and competitiveness;
- Faster and more adequate application of integrated management systems;
- Development of technical-technological infrastructure, primarily on the basis of procurement of new equipment;
- More intensive application of modern management methods and techniques.

Improving quality reduces business costs due to fewer alterations, errors, delays, scraps, as well as better use of equipment, raw materials and supplies. Overall, better management of business resources is achieved. Reducing business costs directly affects productivity. Lower costs and better productivity lead to a more flexible pricing policy - selling standard quality products at lower prices than the competition. A successful business organization must be able to simultaneously improve, expand and innovate. The

organization must be open to the acquisition of new knowledge and focused on the continuous improvement of knowledge productivity in the function of improving business productivity and developing competitive ability.

The essence of new technologies is in increasing business productivity, which improves the competitiveness. The application of new technological solutions can increase the production capacity, reduce the use of human labour and, in the end, reduce the cost of doing business per unit of product. There is no better way to invest in the future than investing in knowledge.

CONCLUSION

Business excellence and world-class products and services can only be achieved on the basis of continuous improvement of quality of business processes, which is based on increasing the productivity and knowledge of each individual employee in the organization. The main problem of domestic companies is non-competitiveness that occurs because of poor business productivity, lack of application of new technologies and knowledge, and inadequate or non-existent application quality management.

It can be concluded that the issue of improving the productivity of domestic companies implies stronger investment in the technical and technological basis of business, especially in the procurement of modern equipment. In addition, it is important to implement global experience and modern management methods and techniques, especially integrated management systems, which are the basis for improving business efficiency and developing competitiveness in the global market. This paper provides a solid overview on the importance of productivity when it comes to achieving competitiveness. For future research it is recommended to address data from companies across industries in order to further investigate the mechanisms that affect productivity and achieving competitiveness.

ACKNOWLEDGEMENT

This work is a part of the current project TR-35017 funded by Ministry of Education, Science and Technological Development of the Republic of Serbia.

REFERENCES

Bakator, M., Đorđević, D., & Ćoćkalo, D. (2019). Developing a model for improving business and competitiveness of domestic enterprises. *Journal of Engineering Management and Competitiveness (JEMC), 9*(2), 87-96.

Bešić C., i Đorđević D. (2017). *Savremeni menadžment trendovi* [in Serbian]. Čačak: FTN.

Bešić C., i Đorđević D. (2019). *Strategijski menadžment* [in Serbian]. Čačak: FTN.

Bešić C., i Đorđević D. (2020). *Upravljanje promenama* [in Serbian]. Čačak: FTN.

Draker, P. (1995). *Menadžment za budućnost* [in Serbian]. Beograd: PS Grmeč – Privredni pregled.

Đorđević, D., i Ćoćkalo, D. (2010). *Osnove marketinga* [in Serbian]. Zrenjanin: TF Mihajlo Pupin.

Fragapane, G., Ivanov, D., Peron, M. et al. (2022). Increasing flexibility and productivity in Industry 4.0 production networks with autonomous mobile robots and smart intralogistics. *Annals of Operation Research, 308*, 125–143. https://doi.org/10.1007/s10479-020-03526-7

Kotler, P., i Caslione, J. (2009). *Kaotika* [in Croatian]. Zagreb: Mate.

Krebs, V. (2007). Managing the 21.st century organization. *IHRM Journal, 11*(4), 2-8. www.orgnet.com

Popović, B. (2021). Evaluation of product quality with decibels. *Journal of Engineering Management and Competitiveness (JEMC), 11*(2), 106-114.

Republički Zavod za Statisttiku - RZS (2020). *Performanse poslovanja privrede Republike Srbije 2015-2019*. Beograd, 2020. https://publikacije.stat.gov.rs

Shen, Y., Yue, S., Sun, S., & Guo, M. (2020). Sustainable Total Factor Productivity Growth: The Case of China. *Journal of Cleaner Production*, 120727–. https://doi.org/10.1016/j.jclepro.2020.120727

Skapars, R., Jekabsone, S., Priede, J., & Skribane, I. (2017). Productivity and its impact on the competitiveness of Latvia. *European Research Studies Journal, 20*(3A), 920-930.

CHARACTERISTICS AND FACTORS OF INNOVATION OF SMALL AND MEDIUM ENTERPRISES

Miloš Ivaniš
Euro Audit doo, Belgrade, Republic of Serbia
E-mail: mivanis97@gmail.com
Živan Bajić
Banka–Poštanska štedionica, Šabac, Republic of Serbia

ABSTRACT

Today's companies face serious and very diverse challenges: expansion of the global economy, fierce clash for markets, drastical reduction of the product life, rapid technological changes, structural transformation, reducing the size of companies, etc. To meet these challenges, enterprises must constantly increase productivity, improve the quality of products and services, develop new products and services, and continuously examine consumer demands and desires. In general, this means that companies must be invariably innovative, as the focus of modern business is constant improvement in all components of business structure and operations. At the same time, the company's ability to bring better, more functional, cheaper and more attractive products to the market is an indicator of the development of innovative processes in a particular company. However, just as companies need to be constantly renewed through innovation, so too national economies must constantly change. In this context, innovation is crucial because it stimulates economic, employment and income growth, improves the quality of life of the population and the competitiveness of the national economy. Accordingly, in modern economies, small and medium enterprises have significant effects in the economy. Considering this fact, the aim of this paper is to present the basic characteristics and factors of innovation processes in small and medium enterprises.

Key words: Small and medium enterprises, Innovations, Innovation process, Entrepreneurship.

INTRODUCTION

Broadly speaking, it could be said that innovation refers to all scientific, technological, organizational, financial and commercial activities which contribute to improving a product, working method or a service, or to implement new, technologically advanced products and services. The introduction of novel technologies, the development of human capital and significant improvements in the organization of production has increased the efficiency of companies and enabled them to produce not only much better products than their competitors, but also to reduce the costs. At the same time, new products and services offered to consumers (customers) facilitate the development of a company and conquering new markets. In this way, innovations enable innovative companies to differ from their competitors, as well as affect the economy as a whole and its development and competitiveness. In order for innovation to appear on the market and contribute to the realization of business success of an economic entity and thus lead to the success of the economy as a whole, it is necessary that there is someone who will start the innovation. In that context, it can be said that these are, above all, entrepreneurs in the sector of small and medium enterprises. New ideas are being created in small and medium enterprises and fast and efficient economic solutions are being sought. Seeking business opportunities and solving risks belongs to small and medium enterprises, which are much more flexible and adaptable than large economic systems, because in SMEs entrepreneurship as an organizational skill is, in fact, a form of adjustment.

In the context of the above, it is not surprising that in the last decade of this century, the importance of innovative small and medium enterprises has greatly increased. Namely, many experiences of highly developed countries show the growing importance and opportunities of small and medium enterprises in

the field of innovation development. A large number of studies have shown that the size of the company contributes little to its intensity and innovative effort. Such attitudes are confirmed by the fact that more than half of the 70 most important inventions in the 20th century come from individual inventors whose innovative entrepreneurial spirit created many products such as personal computers, radar, jet engine, biosynthetic insulin, cellophane, ballpoint pen, etc. This is also confirmed by the fact that 46 of the 58 inventions (inventions) in the USA and Western Europe in the 20th century actually belong to individuals and small companies. Therefore, it is not surprising that in the last 10 years special importance is given to the establishment and role of new (young) innovative small and medium enterprises which are considered to have a *de facto* critical role in the development, dissemination and implementation of innovations, which indirectly contributes to development and increasing the competitiveness of the overall economy.

INNOVATIVE CHARACTERISTICS OF SMALL AND MEDIUM ENTERPRISES

Innovative activities of small and medium enterprises represent a continuous process and have a much more important role for economic growth and development of innovation in the economy than it was first recognized. In addition to new, radical and economically significant innovations, innovation in the SME sector also includes the introduction of existing but improved products, services and processes, new appearances in new markets, the introduction of new or improved organization and management systems in small and medium enterprises.

Also, it should be noted that, compared to large enterprises, small and medium enterprises have a completely different role in the innovation process. Namely, the largest number of small and medium enterprises is primarily market-oriented, and less research-oriented. In that regard, SMEs use new market possibilities and development opportunities faster, they are more flexible and better adapt to market demands, due to the fact that they are more focused on small gradual innovations. Analogously, the role of small and medium enterprises in the innovation process is determined by a number of different factors related to the technology itself, as well as the structure and requirements of the market. Unlike large companies that have greater opportunities to attract financial, material and human resources and, owing to this fact, can carry out innovative activities that require high capital investment, SMEs have a much more significant role in innovation which is more focused on some segmented markets where the development of specialized products and services in a way complements the offer of large companies and thus completes the value chain in the economy.

Compared to large business systems, SMEs rely more on their own informal innovations rather than on formal ones, as they are less able to use exclusively external inputs unlike larger enterprises. In addition, their management structure is quite specific, because the forms, methods and principles of management in small and medium enterprises are significantly different from large enterprises. Namely, management in small and medium enterprises is relatively simple because there is no need to create complex and cumbersome systems of planning, control and coordination of work within the company. In small and medium enterprises, there are hardly any factors that contribute to the bureaucratization of management and its separation from real problems and production. Consequently, in many small and medium enterprises, management functions are not even separated from ownership. This contributes to the limitation of the range of various administrative procedures and connecting, i.e. merging of management and engineering-technical functions in small and medium enterprises. Also, a set of specialized management functions (bookkeeping, rationalization of document circulation, etc.) is performed by the engagement of external consultants.

In the context of the aforementioned, it should be noted that in the literature there is a large number of reviews of the most significant advantages of SMEs over large enterprises, both in business and in their innovative activities. From the perspective of innovation, the most significant characteristics of small and medium enterprises are mainly the following:

1. Flexibility, initiative and dynamism in making management decisions;
2. Lack of inertia to adapt to changes and market conditions;
3. Expressed preference for new, original innovations and technologies;

4. Lack of excessive bureaucracy and formalism in innovation process organization;
5. High ability to provide diversified products in line with demand;
6. Relatively low capital intensity;
7. Rapid return on investment;
8. Matching SME production with modern market demand trends.

As can be seen from the aforementioned characteristics, innovation-oriented small and medium enterprises appear as a unique source of diversification, flexibility and long-term improvement of the performance of an innovation system. They play a primary role in discovering and developing new markets and expanding supply in existing markets. In addition, these companies are testing, researching and pushing the boundaries of production and consumption, seeking for new ways on how to better meet consumer needs, they are a significant driver of overall economic development, as well as an important factor in creating new jobs and increasing employment in the overall national economy. Simultaneously, the realization of the increasingly relevant and important role of innovation-oriented small and medium enterprises in economic development and increasing employment largely depends on the existence of a favourable business environment and entrepreneurial culture.

Accordingly, it should be borne in mind that the development of entrepreneurial culture during the last decade of this century has contributed to numerous social and economic factors, especially the disadvantages of corporatism and knowledge of the problems of economies of scale and other shortcomings of large enterprises and business systems. Namely, practice has shown that the effects of economies of scale do not have to be as implied by economic theory, the size of companies has its downsides and large companies are not necessarily more innovative and socially responsible than small and medium enterprises. Also, the practice has shown that large companies are not the main creator of new jobs. In addition, the development of entrepreneurial culture was facilitated by some psychological factors, primarily the loss of employment security, which directly affected the reduction of the risk of starting a business on one's own.

FACTORS OF INNOVATION OF SMALL AND MEDIUM ENTERPRISES

A large number of researches conducted during the last decade indicate the great role of inner (internal) and outer (external) factors that determine the degree of innovation of small and medium enterprises. Among the internal factors, the most important ones are the availability and quality of human resources, financial strength and absorption capacity of small and medium enterprises. Among the external factors, the most important ones include the possibility of connecting with other companies related to the field of innovation, as well as favourable positioning within supply and value chains. At the same time, various authors tried to find out what are the factors that determine the speed and quality of innovation in the sector of small and medium enterprises. In such analyses, the eight most important factors have been identified, which we will hereafter explain.

(1) Capital resources - are a significant factor that determines the speed and quality of innovation in small and medium enterprises. When it comes to access to and disposal of resources, SMEs have relatively limited opportunities and have more difficult access to funding. As a result, SMEs are more dependent on a small number of products and services and cannot achieve economies of scale. Due to limited resources, predominantly financial ones, SMEs usually have very limited resources for research and development activities and find it more difficult to replace certain products within the product range, as well as burdensome to test product models.

(2) Marketing and technical resources - are also a very important factor that affects the speed and quality of innovation in small and medium enterprises. Similar to financial resources, small and medium enterprises, in general, have fewer opportunities when it comes to marketing and technical resources compared to large enterprises. Consequently, SMEs have less media and marketing presence in the market and find it much more difficult to build recognizable trademarks of products and brands, which sets hurdles for their promotion and presentation to potential consumers.

(3) Quality of management - is an almost predominant factor that determines the speed and quality of innovation in small and medium enterprises. The most suitable model for these companies is the so-called linear management structure, yet management in some SMEs often has limited and insufficient management knowledge in the field of business management, business planning, implementation of management activities, quality standards, etc. Small and medium business owners usually lack the necessary education and work experience, which can be partially compensated by purchasing services from professionals and consulting firms. However, the enthusiasm of the owners is not enough for the success of the SME, as the appropriate management knowledge is also needed.

(4) The ability to innovate - is determined by multiple factors, and accordingly, there is a big difference in the ability to innovate in small and medium enterprises, which is most pronounced in SMEs from different industries. However, what most small and medium enterprises have in common is that they face limited capital and human resources, insufficiently developed business culture, insufficient expertise of management and lack of work experience, particularly when it comes to connecting companies into different business networks.

(5) Innovation process - as a factor affecting the speed and quality of innovation in small and medium enterprises implies that innovation processes in small and medium enterprises are characterized by being less formalized and that an informal planning and communication strategy is applied, unlike in large companies. Therefore, the quality of the innovation process in SMEs significantly depends on the ability of the manager (owner) of the company. Consequently, obsession with new ideas should be the main characteristic of innovative managers under modern business conditions, because if management is intensively involved in encouraging and developing innovative activities this will lead to programmed innovation processes in SMEs.

(6) Organization of business and innovation processes - is a very important factor that affects the speed and quality of innovation in small and medium enterprises. This refers to the fact that one of the important features of small and medium enterprises is flexibility, collective motivation and usually simple organizational structure that allows them to accelerate decision making in relation to large companies and business systems. Simplicity, speed and flexibility in making decisions usually depend on one or several top managers of the company, who are usually fully aware of everything that happens in the company and are able to competently cover different aspects of the company's business.

(7) Strategy and planning - are important factors for the speed and quality of innovation because they are of a strategic nature. However, as such, they are not particularly important for small and medium enterprises, as many SMEs avoid defining precise goals and clearly defining their business tasks. Consequently, it is logical to conclude that strategic planning in small and medium enterprises is less formalized and varies in importance from case to case. Nevertheless, the modern model of organization requires a model of coordination between strategy, processes and business functions in order to smoothly implement the strategy and feedback which speaks of the level of success in its implementation. This requirement can be achieved only by appropriate innovations in the very concept and techniques of management (strategic management).

(8) Alliance - is a factor that in certain conditions can be very significant when it comes to the speed and possibility of innovative activities in the SME sector. SMEs are much more motivated and focused on connecting to various associations, networks and business alliances, because in this way, they get the opportunity to overcome some of the limitations inherent in the SME sector. By joining various alliances, small and medium enterprises get the quality human and all other resources they need, increase the importance and bargaining power in the market and thus reduce the benefits of large enterprises and business systems. Also, the connections enable them to disperse financial risks, transfer technology easier, as well as to increase their production efficiency and competitiveness.

On the other hand, it should be mentioned that through the system of economic integration there have been very different forms of connecting small and medium enterprises with large enterprises, primarily in the

field of production. Large companies and business systems do not favour organizing narrowly specialized production within their framework, as it carries too much of a variety of different products. Therefore, they entrust part of their product range to SMEs that specialize in the production of one or more products (or parts), which are then assembled into larger blocks and delivered to final consumers. In this way, the basic production of SMEs consists of parts, assemblies and products of certain stages of the technological process, and sometimes even operations on the assembly of the finished product. This type of connection is especially suitable for small and medium enterprises which do not have a great chance of surviving on the market on their own. This is especially true of technologically complex products whose organization of production and sales requires large management, financial and technical resources which small and medium enterprises do not possess.

CONCLUSION

Respecting all the factors that determine the speed and quality of innovation in small and medium enterprises, the main conclusion is that due to the large number of these factors and their complexity, small and medium enterprises need to find the most efficient way to manage limited financial, human, marketing, innovation and other resources in order to be able to be innovative and competitive in the market. Despite the large number of SMEs struggling to survive in highly developed countries today, the fact remains that there are many very successful SMEs which take the lead in some industries and compete with much larger companies based on technological advantages and specialization strategies. Such innovative small and medium enterprises accept the philosophy that there is always a better way of doing business and they tirelessly search for new ideas and innovations that will increase their value and reduce costs, because innovation is the main driving force of development regardless of company size. Also, in the conclusion of this paper, it would be useful to point out that small and medium enterprises as innovators have myriads of advantages over large enterprises. In general, these benefits are essentially behavioural and related to the internal organization of activities and the way SMEs communicate with customers and markets. Flexibility, resourcefulness and speed are the basis of the innovative advantage of small and medium enterprises, whereas they cannot compete with large enterprises in industries where resources and their management are of great importance. Therefore, increasing the level of innovation of small and medium enterprises probably requires measures that would also be aimed at improving access to resources, yet which also contribute to maintaining the organizational flexibility of small and medium enterprises.

REFERENCES

Atkinson, R., Ezell, S. (2014). *Ekonomika inovacija*, Mate doo, Zagreb i Zagrebačka škola ekonomije i menadžmenta, Zagreb.

Avlijaš, R. (2008). *Preduzetništvo i menadžment malih i srednjih preduzeća*, Univerzitet Singidunum,Beograd.

Deakins, D, Freel, M. (2012). *Preduzetništvo i male firme*, Data Status, Beograd.

Jančetović, M, Erić, I. (2012). *Menadžment inovacija*, Beogradska poslovna škola, Beograd.

Kontić, LJ. (2008). *Inovacije – izazovi za budućnost*, Zadužbina Andrejević, Beograd.

Levi Jakšić, M, Marinković, S, Petković, J. (2015). *Menadžment inovacija i tehnološkog razvoja*, Univerzitet u Beogradu, Fakultet organizacionih nauka, Beograd.

Lukinović, M, Stamatović, M, Šarkić, N. (2017). *Inovacije, pravno-ekonomski aspekti*, Pravni fakultet Univerziteta Union u Beogradu i Javno preduzeće "Službeni glasnik", Beograd.

Marinković, S. (2012). *Menadžment inovacija u uslugama*, Zadužbina Andrejević, Beograd.

Nikolić, M. (2014). *Inovativnost malih i srednjih preduzeća kao faktor privrednog razvoja Srbije,* (doktorska disertacija), Univerzitet u Nišu, Ekonomski fakultet.

Novaković, V, Samardžić, D. (2000). *Mali biznis i preduzetništvo*, Drasler Partner, Beograd.

Novi Sad, Univerzitet Privredna akademija u Novom Sadu.

Ožegović, L, Đorđević, D. (2020). *Preduzetništvo,* Fakultet za ekonomiju i inženjerski menadžment,

Paunović, B. (2014). *Preduzetništvo i upravljanje malim preduzećem*, Ekonomski fakultet, Beograd.

Pećanac, R. (2009). *Razvoj i upravljanje inovacionim procesima*, Srbija Invent, Zrenjanin.

Penezić, N. (2010). *Preduzetništvo – savremeni pristup*, Akademska knjiga, Novi Sad.

Simonović, D, Joksić, J, Travica, J. (2019). *Menadžment porodičnih preduzeća*, Visoka škola strukovnih studija, Aranđelovac.

INNOVATION CAPACITY OF SMALL AND MEDIUM ENTERPRISES

Miloš Ivaniš
Euro Audit doo, Belgrade, Republic of Serbia
E-mail: mivanis97@gmail.com
Živan Bajić
Banka–Poštanska štedionica, Šabac, Republic of Serbia

ABSTRACT

In recent years, the importance of innovation of small and medium enterprises in certain activities is growing, specifically the ones where they gain an advantage in the development of innovations. However, not all SMEs have the same need and capacity to innovate. Only a small number of fast-growing highly innovative SMEs are significantly focused on innovation, creating new value for consumers, thereby contributing to the innovative development of the economy. The innovative capacity of a company refers to its ability to successfully implement innovations. Bearing in mind the fact that the innovation process includes the ability to find ideas (invention) and its introduction to the market (innovation), the conclusion is that the innovation capacity of a company is conditioned, on the one hand, by the ability to find new ideas and on the other hand, by possibilities of their realisation. Therefore, the innovation capacity is not the same for all SMEs because it depends on a large number of factors. Taking into consideration that the innovation capacity of a company predominantly determines the scope and type of its competitive advantage, the conclusion is that if a company wants to gain and maintain a competitive advantage, it must have a general innovation ability, i.e. innovation capacity. In this context, the aim of this paper is to present a model of innovation capacity of SMEs, which is determined by eight basic segments, i.e. components.

Key words: Small and medium enterprises, Innovations, Innovation capacity, Entrepreneurship.

INTRODUCTION

Innovation is the ability of a company to come up with new ideas, new ways of production, new business models, new products and services, as well as to solve problems and challenges faced by companies in a new way. At the same time, the main purpose of innovation is to change the status quo, trends, procedures, costs of products and services, knowledge and skills of people and their actions to achieve economic, social and other goals. Therefore, innovations aim to change the potential for wealth creation, giving resources new properties and capabilities, incentivising new economic activities and creating new power and new value creation, in order to transform worthless resources into usable and significant ones.

The company's ability to innovate determines its position in the market and the ability to meet the needs of consumers (customers). Accordingly, innovative activities of the company are a key driver and source of business success. Innovation always leads to new ideas, new solutions and new types of business, especially in the SME sector. Many small and medium enterprises have built the ability to innovate efficiently, which allows them to improve their business and secure a significantly better market position. For the reasons of survival and development, SMEs must implement and constantly improve their innovation activities in order to be successful in creating and applying new knowledge and innovations. Simultaneously, the capacity of SMEs to successfully innovate determines the scope and type of their competitive advantage.

Innovative capacity means the ability of a company to successfully implement innovations. Bearing in mind the fact that the innovative process includes the ability to come up with new ideas (invention) and introduce them to the market (innovation) it follows that the innovation capacity of the company is

conditioned, on the one hand, by the ability to find new ideas, and on the other hand, by possibilities of their realisation. Innovation capacity is not the same for all small and medium enterprises because it depends on a large number of factors, such as: the area in which the company operates, the business environment, chances and opportunities for exchange of knowledge and information, innovative cooperation of companies, the availability of professional, qualified and innovation-oriented staff in the company, the ability to manage innovation processes, the accessibility to existing technologies, financial funds, the availability and development of infrastructure, the existence of business networks and alliances, etc.

Taking into account that the innovation capacity of a company determines the scope and type of its competitive advantage, it could be concluded that innovation can be viewed as a specific strategy for obtaining and maintaining the competitive advantage of the company. Analogously, the willingness to react to change has become a basic principle in the management of small and medium enterprises. This principle is called "innovation-based management". The main competitive advantage of any company is its ability to innovate. Innovation results in an advantage over the competition, and the achieved competitive advantage results in an increase in profits, which is the main goal of every company, regardless of its size.

ENTERPRISE INNOVATION CAPABILITY MODEL

Innovation forms the basis for the future of every modern enterprise. Consequently, innovation should be a key element of every company's strategy, regardless of whether it is a small, medium or a large enterprise. In this context, there are three basic approaches to innovation, especially when it comes to small and medium-sized enterprises, which include: *Firstly*, undertaking many small innovations in every business activity, which in fact gives organizational competence that is difficult to copy; *Secondly*, undertaking several valuable major innovations that keep pace with the current state of science; *Thirdly*, exploring opportunities for systemic innovation that can provide radically different ways to meet consumer needs. If the company wants to follow all three of these innovation approaches, then it must have a general innovation capability that is presented in the model of innovation capability with 8 segments, i.e. components. These include:

1. Component 1 – Enterprise
2. Component 2 – Energy
3. Component 3 – Authority
4. Component 4 – Experiment
5. Component 5 – Insight
6. Component 6 – Intention
7. Component 7 – Investment
8. Component 8 – Implementation

These segments-components of the enterprise innovation capability model are illustrated in *Figure 1*. Considering their importance, we will hereafter explain each of the segments of aforementioned model in more detail.

Component 1 - Enterprise. This component of enterprise innovation capability model refers to the fact that new challenges should be constantly sought, whereby the organizational culture should support the enterprise value system. Those people who lead innovations should adopt the so-called *pirate spirit*. The stages of action for enterprise development should include the following: *Firstly*, identifying the value of drivers (internal entrepreneurs); *Secondly*, accepting investments in the future; *Thirdly*, setting strategic goals for exploring new areas.

Component 2 - Energy. This component of the enterprise innovation capability model refers to the fact that innovative enterprises are full of energy and optimism. High energy levels are natural in team-based businesses, but rigidity, narrow-mindedness, pessimism and fear can rob a company of excitement, passion and enthusiasm. Such *energy sinkholes* undermine and destroy the innovative capability of the company.

Managers need to release latent energies and channel passion to explore the potential of new ideas. In doing so, organizational leaders must be excited about ideas and must act enthusiastically. Last but not least, they must be ringleaders. In this component of the enterprise innovation capability model, the stages of action for the development of organizational energy include the following: *Firstly*, employing people of unusual energy; *Secondly*, making quick positive decisions about what needs to be done; *Thirdly*, investing in the personal development of key employees.

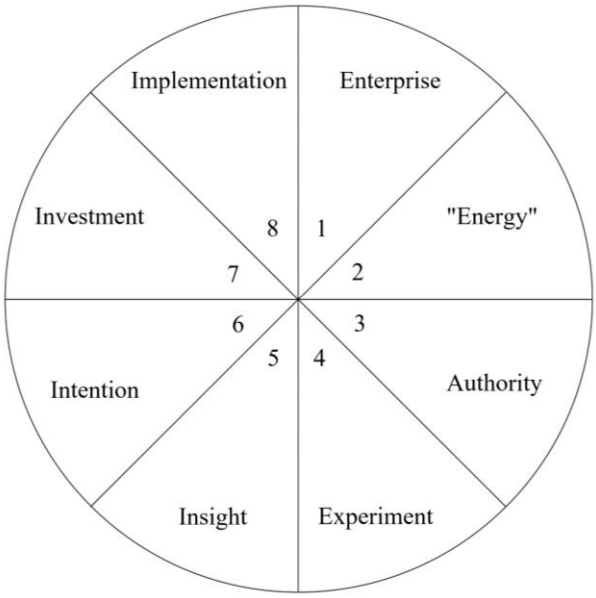


Figure 1: Enterprise innovation capability model

Component 3 - Authority. This component of enterprise innovation capability model implies that many people in the company, i.e. employees must be a source of information, and in order to be able to contribute to innovation, they must all be authorized. Significant creativity is released when each employee feels the need to look around and find new or better ways to do something. The authority for innovation encourages people to search for ideas, experiment and come up with their own innovative proposals and solutions. Since innovation initiatives may require certain resources, it is necessary for the company's management to commit to this. Thus, innovation requires a partnership between authorized, creative employees and determined company managers. Thereby, the basic stages of authority development are reflected in the following: *Firstly*, ensuring expectations that everyone should contribute to innovation; *Secondly*, training managers to authorize members of their teams; *Thirdly*, asking key workers to develop new ideas.

Component 4 - Experiment. This component of the enterprise innovation capability model emphasizes that innovation requires experimentation. A huge number of ideas may need to be reviewed, examined and researched, but only a fraction of them will be adopted. Hence, it makes sense to adopt only those ideas that provide maximum benefits. The latent value of an idea is often hidden when it is first proposed. Therefore, ideas need to be explored to make the costs and benefits of implementation more clear-cut. In this regard, it should be noted that industries based on creativity, such as fashion, film industry and pharmaceutical research, are very well-aware of the importance of experimentation, because they fully consciously and deliberately test ideas and use the most objective procedures at their disposal to evaluate them. Such techniques are most often used by the so-called growing industries. Experimentation is necessary for three main reasons: *firstly*, experimentation incentivises the development of ideas; *secondly*, it reduces risk because objective information provides a solid basis for decision making, and *thirdly*, experimentation alone is an extremely powerful source of learning because those involved in the process of experimentation gain first-hand insight into how realistic it is for an idea to be realized in practice. Incidentally, the basic stages of action for the development of experimentation are reflected in the following: *Firstly*, establishing a fund for the so-called *speculative initiatives*; *Secondly*, the formation of special groups and teams for experimental work; *Thirdly*, accepting the fact that some projects may fail.

Component 5 - Insight. This component of the enterprise innovation capability model implies that organizations (enterprises) are not only engaged in innovation, but are engaged in innovation with a goal. In other words, in order to know where innovations are needed, one must have an insight, i.e. an insight into the wishes and needs of people. For these purposes, market research techniques are most commonly used. Simultaneously, it is also of utmost importance to know the customers and have an insight into the very potential of an idea. Insight requires the power of perception, openness of mind and great perseverance. It is necessary to look further than others and to look at things more deeply. Therefore, this certainly requires people with a vision working together to create an image of what the future holds. In this context, gaining insight should become a *de facto* way of life. Additionally, it should be noted that the stages of action for the development of insight are reflected in the following: *Firstly*, involving many people in approaching consumers and market research; *Secondly*, researching the needs and desires of potential customers who are not currently consumers; *Thirdly*, researching into the potential of the so-called emerging technologies.

Component 6 - Intention. This component of the enterprise innovation capability model implies directing efforts towards the requirements of innovation by a clear presentation of intentions. Accordingly, it is primarily the task of executives, i.e. managers who must clearly illuminate the direction in which the organization (company) should go. Good ideas are usually found only because someone is looking for them. While it is impossible to guarantee creativity, the fact remains that a targeted search for ideas often yields good results. This also means that there is a close relationship between innovation and strategy. In addition, it should be said that the stages of action for the development of intentions for innovation should be reflected in the following: *Firstly*, establishing powerful *ad hoc* teams to explore the defined so-called *opportunity spaces*; *Secondly*, forming alliances with innovative start-ups and sharing ideas with them; *Thirdly*, developing scenarios regarding what the future may be and thereby defining one's role in it.

Component 7 - Investment. This component of the enterprise innovation capability model, logically, implies that innovation requires investment, i.e. spending money. Although some innovations are completely free because they require only the time and effort of people, in the later stages innovation may require the investment of additional funds, including significant amounts of money and time of executives (managers). Innovation requires very intensive work. When the management of a company chooses to invest in a large innovation project, then one door of opportunity opens, but it will probably close some other one. This practically means that a company can only deal with a certain amount of innovation. If an enterprise follows too many ideas at the same time, then resources will be wasted and the creative and innovative intensity of the company will debilitate.

Innovation poses many dilemmas for the company's financial executives because it is very difficult, and sometimes even impossible, to predict the value that will be created at a point in time when the idea itself is used or commercialized. Hence, such assessments require great knowledge, skills, rational mind and intuition on the part of the company's financial executives. In addition, worth noting are the stages of action for investments in innovation. These are mainly reflected in the following: *Firstly*, setting aside a precisely defined fund that is needed for innovation; *Secondly*, it is better to invest in a few good initiatives (ideas) than to waste resources irrationally; *Thirdly*, setting the so-called *aggressive targets* for all of the selected and defined investment projects.

Component 8 - Implementation. This component of the enterprise innovation capability model implies the possibility of selected ideas being applied in practice, i.e. their possible implementation as innovations, which practically means that they can make a contribution to change. At the same time, the implementation of smaller innovations often takes place among the working groups in the company, whereby such innovations represent local challenges. However, large innovation initiatives can often require very complex changes that require a lot of cooperation between different groups and, as such, they pose significant challenges for company executives (managers). In this regard, some forms of innovation, especially in technical products, start in the R&D department and later move to the production department. In these cases, the effective implementation of product innovation requires that horizontal processes are optimized and precisely arranged. In addition, it is worth mentioning that the basic stages of action to improve the implementation of innovation are reflected in the following: *Firstly*, setting up an orderly innovation process (e.g. identifying phases and outputs); *Secondly*, determining one person responsible for

the overall innovation process; *Thirdly*, trying to reduce useless boundaries between different groups of employees in the enterprise.

Small and medium enterprises often do not have the opportunity to afford professional staff for investments, marketing, product quality, management system, application of new technologies, etc. Due to these and many other limitations, a lot of SMEs are not able to significantly develop their innovation capacity and their innovation capability. Consequently, in order to initiate the components of innovation in SMEs, certain consulting services are offered on the market. The role of the consultant in the process of innovative approach in SMEs is important for several reasons: *firstly*, the consultant has a neutral approach to the problem, *secondly*, they provide a completely different point of view, *thirdly*, they increase efficiency and rationality in solving problems, and *lastly*, they focus on results, which practically gives SMEs new quality and value.

CONCLUSION

Bearing in mind all of the above, the main conclusion is that innovation is a key element of the strategy of every enterprise. It is an extremely complex process consisting of many different elements and activities. Simultaneously, the main question that arises today is the possibility of innovation management. At times it may seem *de facto* impossible to manage something so complex and uncertain, due to the fact that many innovation projects fail. Nevertheless, some of them bring great success and profits. Consequently, it could be concluded that successful innovative companies have developed such innovation management techniques that, in spite of no firm guarantee of success, the implementation of certain activities may increase the likelihood of innovation being successful. Innovation is a key driver and source of business success of companies and collectively the economy as a whole. Accordingly, the willingness to respond to change has become the main approach in the management of SMEs, under the term "innovation-based management". This means that the main competitive advantage of any enterprise is its ability to innovate, which represents its innovation capacity. In conclusion, it should be borne in mind that innovation is, without any doubt, the key point on which the future of every company is based on. That being the case, innovation should be a key element of any company's business strategy, regardless of whether it is a small, medium or a large enterprise.

REFERENCES

Atkinson, R., Ezell, S. (2014). *Ekonomika inovacija*, Mate doo, Zagreb i Zagrebačka škola ekonomije i menadžmenta, Zagreb.

Avlijaš, R. (2008). *Preduzetništvo i menadžment malih i srednjih preduzeća*, Univerzitet Singidunum, Beograd.

Deakins, D, Freel, M. (2012). *Preduzetništvo i male firme*, Data Status, Beograd.

Jančetović, M, Erić, I. (2012). *Menadžment inovacija*, Beogradska poslovna škola, Beograd.

Kontić, LJ. (2008). *Inovacije – izazovi za budućnost*, Zadužbina Andrejević, Beograd.

Levi Jakšić, M, Marinković, S, Petković, J. (2015). *Menadžment inovacija i tehnološkog razvoja*, Univerzitet u Beogradu, Fakultet organizacionih nauka, Beograd.

Lukinović, M, Stamatović, M, Šarkić, N. (2017). *Inovacije, pravno-ekonomski aspekti*, Pravni fakultet Univerziteta Union u Beogradu i Javno preduzeće "Službeni glasnik", Beograd.

Marinković, S. (2012). *Menadžment inovacija u uslugama*, Zadužbina Andrejević, Beograd.

Nikolić, M. (2014). *Inovativnost malih i srednjih preduzeća kao faktor privrednog razvoja Srbije*, (doktorska disertacija), Univerzitet u Nišu, Ekonomski fakultet.

Novaković, V, Samardžić, D. (2000). *Mali biznis i preduzetništvo*, Drasler Partner, Beograd.

Ožegović, L, Đorđević, D. (2020). *Preduzetništvo,* Fakultet za ekonomiju i inženjerski menadžment, Novi Sad, Univerzitet Privredna akademija u Novom Sadu.

Paunović, B. (2014). *Preduzetništvo i upravljanje malim preduzećem*, Ekonomski fakultet, Beograd.

Pećanac, R. (2009). *Razvoj i upravljanje inovacionim procesima*, Srbija Invent, Zrenjanin.

Penezić, N. (2010). *Preduzetništvo – savremeni pristup*, Akademska knjiga, Novi Sad.

Simonović, D, Joksić, J, Travica, J. (2019). *Menadžment porodičnih preduzeća*, Visoka škola strukovnih studija, Aranđelovac.

THE ROLE OF THE CONCEPT OF SOCIETY 5.0 IN ACHIEVING SUSTAINABLE DEVELOPMENT AND COMPETITIVENESS

Milica Josimović
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia
E-mail: milica.josimovic@tfzr.rs
Milena Cvjetković
College of Academic Studies, "Dositej", Belgrade, Serbia

ABSTRACT

Society 5.0 expands the concept of Industry 4.0 in order to solve social problems and create conditions for sustainable economic development. The transition from Industry 4.0 to Society 5.0 is made possible by the action of various technologies such as artificial intelligence, Big data, Internet of Things and understanding the connection between cyberspace and the real world. The application of these technologies has enabled significant changes in society. Rapid technological advances have led to global challenges facing the world, such as the depletion of natural resources, growing economic disparities and terrorism. The concept of society 5.0 aims to focus on man to balance the application of modern technologies to solve the problems of competitiveness, productivity and well-being of society. The aim is to maximize the human use of current technological transformations. The paper analyzes the aspects of society 5.0 on the creation of a sustainable economy, primarily through adequate quality management and improving competitiveness. The aim of the research is to analyze the concept of society 5.0 to point out the guidelines and strategies for achieving sustainable economic development of the domestic economy and improving the business and competitiveness of its economic entities.

Keywords:: Society 5.0, technology, Sustainable development, Quality, Competitiveness.

INTRODUCTION

The company has undergone a number of changes from the beginning of the development of Industry 1.0 in Europe until the development with the 4.0 revolution and to the current concept of 5.0 society. Together with the idea of sustainable development goals, it begins to develop a society that is integrated with technology. Technology is becoming a necessity needed to facilitate all the activities of modern society. The knowledge that drives all this progress brings a social order and a human civilization that is integrated with technology. Technology as a result of thinking from knowledge creates a new human civilization, in which people perform their activities much more efficiently and in a shorter time.

The concept of Society 5.0 aims to address social issues from a new perspective. The aim of this law is to establish social foundations on which everyone can develop value, at any time and place, in a safe environment and in harmony with the natural environment, without any restrictions that currently exist. This new concept of society aims to focus on man to balance the application of big data technologies, the Internet of Things (IoT) and artificial intelligence with solving major social problems such as: competitiveness, productivity, connectivity and well-being.

FROM INDUSTRY 4.0 TO THE CONCEPT OF SOCIETY 5.0

The concept of Industry 4.0 arose as a result of combining information and communication technologies, artificial intelligence and the Internet of Things and industrial activities. Thanks to this technological development, companies have been able to organize their business processes and

connect global or dispersed production/service lines in a more efficient, faster and cheaper way (Arıcı, Kitapci, 2021). The fourth industrial revolution was characterized by cyber physical systems with the main goal of fulfilling the necessary agility in the production process in order to increase the overall efficiency and effectiveness of the entire industry (Bakator et al., 2018). The most important advantage of Industry 4.0 for customers is that it will enable companies to focus their business on personalized customer-oriented processes. A limited range of companies will enable the production of mass and individually tailored product thanks to Industry 4.0 (Büchi et al., 2018).

Industry 4.0 follows Society 5.0 to some extent, but while Industry 4.0 focuses on production, Society 5.0 aims to put human beings at the center of innovation, taking advantage of 4.0 technology and results by deepening technological integration in improving quality of life, social responsibility and sustainability (Holroid, 2022). Society 5.0 appears as a structure that suggests that it is human-oriented for the first time and recommends the application of industrial elements with human-centered studies (Salimova et al., 2019). The main purpose of Society 5.0 is to achieve solutions to the challenges of today and tomorrow by implementing digital transformation at all levels and areas of society. (Savaneviciene et al., 2019). Society 5.0 focuses on the application of technology in continuous development and innovation stimulated for Industry 4.0 to address the problems of humanity such as population aging, natural disasters, social inequality, security and improving the quality of human life. The integration of technology with society will be crucial because it is relevant to the use of drones, artificial intelligence, big data, autonomous trucks and robotics for the benefit of humanity in the near future (Pereira et al., 2020).

In Society 5.0, a huge amount of information from sensors in physical space accumulates in cyberspace. In cyberspace, these big data are analyzed by artificial intelligence (AI), and the results of the analysis are returned to people in physical space in various forms. This process brings new value to industry and society in ways that were not possible before (Onday, 2019). In this evolution, Society 5.0 is an information society built on Society 4.0, which aims for a prosperous, people-centered society. (Fukuyama, 2018). For the development of Industry 4.0 and Society 5.0, the open innovation approach is extremely important. The inclusion of society as a whole, supported by the technologies provided by Industry 4.0, provides progress towards a society 5.0 that will be a creative society, where digital transformation is combined with imagination and creativity of different people to solve social problems and create value. Co-creation of values can be understood as another essential mechanism of functioning through which individuals, obviously supported by more modern technologies, contribute to the transition to society 5.0. (Aquilani et al., 2020).

CONCEPT SOCIETY 5.0

Society 5.0 implements technological solutions, innovative organization of the social system and modeling of locally centered activities to overcome social problems through proactive work on liberation from various types of social constraints (Higashihara, 2018; Nakanishi, 2019). Society 5.0 defines the ideal situation according to which each country should evolve in order to take full advantage of continuous technological transformations, which would benefit all its citizens (Serpa, Ferreira, 2018).

Activities of interaction between people and technologies are developed, adapted and improved based on the needs of the time through efficient management, ensuring minimal deviation (Rahmawati et al., 2021). Society 5.0 transcends the limits of technological and organizational transformation of the industrial system. This includes considering social and human aspects in order to achieve a sustainable environment in this technological context (Salimova et al., 2019). Intelligent robots and systems will influence supply chains, emphasizing that the supply chain 5.0 is a trend that will include three main perspectives: collaborative work between humans and robots (cobots), mass customization and personalization and super smart society (Society 5.0) (Frederico, 2020). Industry 5.0 includes two visions: one relates to the interaction between humans and robots, and the other approaches issues related to the bioeconomy, which is quite related to sustainability issues (Demir et al., 2019).

Research (Zengin et al., 2021) confirms that 5.0 is becoming a mandatory practice for achieving stability in terms of a sustainable economy due to the emergence of Industry 4.0. The main idea of the concepts of Industry 5.0 and Society 5.0 is evolving from digital manufacturing to digital society. Industry 5.0 and Society 5.0 have the main goal of digital technology for the development of society (Salimova et al., 2020).

SOCIETY 5.0 AND SUSTAINABLE DEVELOPMENT

Sustainable competitiveness of enterprises can be observed as: consistency and sustainability of socio-eco-economic aspects of economic activity of enterprises in the short and long-term, diversity of competitive advantages of the company (positive reputation, innovative potential, efficiency of business processes, etc.) and availability and use of departmental (or cluster) advantages, possibilities of building innovations, niche in international specialization of work, efficient chains of added value (Salimova et al., 2019). From an organizational point of view, Society 5.0 strives to create new methods for the functioning of individualistic systems in which companies, universities and governments independently seek to create a common operational concept fueled by current social cohesion (Michna, Kmieciak, 2020). A sustainable society is involved and takes care of its present without jeopardizing the future, organizing in such a way as to improve the quality of life and autonomy of its citizens and to strive for general well-being. Sustainability is a holistic approach that considers different areas, and society is an important base among them (Aquilani et al., 2020).

Society 5.0 revealed the crucial importance of technological development and innovative changing society for creating an integrated framework of sustainable development (Shiroishi et al., 2018). The inclusion of technology, innovation and innovation in sustainability enables the improvement of the expansion of organizations of available sustainable solutions, the creation of infrastructure and capacities for sustainable business and behavior and the support of the improvement of priority sustainable areas of society 5.0. Society 5.0 implements various technological and technical solutions and goods that enable the substitution or replacement of natural resources designed to reduce greenhouse gas emissions, increase responsible production, reduce food loss and more (Savaget et al., 2019).

Sustainable development goals are general goals of improvement, despite the fact that arrangements will vary depending on the financial circumstances or social foundations of the nation or district (today, 2019). Within the development themes, the research (Pereira et al., 2020) focuses on digitalization (eg turning a factory into a smart factory, developing intelligent life) and connecting all devices to the Internet, and this on data storage and analysis, based on methods that use artificial intelligence. Digital technologies also play an essential role in the field of environmental protection. Increasing environmental awareness and increased producer responsibility have increased the need to develop economic, environmental and socially sustainable business strategies. Necessary to mention the policy of the establishment of a high-tech production industry for waste processing. Replacing old products with new and more technologically advanced ones has become a strategic added value for the company. Individually oriented services in Society 5.0 have been proven in several areas, such as energy, food, health care, local regional infrastructure, climate change, and disaster prevention / reduction (Haiashi et al., 2017).

THE ROLE OF SOCIETY 5.0 IN ACHIEVING QUALITY AND COMPETITIVENESS

Social quality is an education-oriented concept that has human values at its core and aims to enable people to have a high quality of life by benefiting from technological development at every stage of human life and encouraging the successful implementation of technological development in society 5.0 by combining the philosophy of total quality management, industry 4.0 and society 5.0 (Arıcı, Kitapci, 2021). In the digital economy, the competitiveness management mechanism is based, as in the traditional concept, on the implementation of tactical and strategic goals of the company, but

achieving competitive advantages is due to factors such as: development of information and communication technologies, development of scientific potential of employees in the organization and maintaining a favorable image of the company (Dubnitskii, Pisarkova, 2020). The competitiveness of companies is primarily influenced by the practice of using the advantages of the digital economy, as well as the scope of using information economy tools (Bagautdinova, Nikulin, 2018). The high-level of competition in the existing market compels companies to overcome new challenges in terms of best prices / costs, quality and delivery time. The industry must be able to respond to innovation and bring new products to market in a short time due to current competition around the world. In order to guarantee the competitiveness of the process along the value chain, it is imperative to devise productive, efficient and flexible methods (Pereira et al., 2020).

Economic Society 5.0 is an economic situation that focuses on the community by providing solutions through new technologies in all industries and social activities to achieve sustainable economic development (Higashihara, 2018). One of the initiatives to build this community must start from business organizations as the most influential institutions of modern society (Potocan et al., 2021). One of the accelerated economic improvements is through economic digitalization, especially small and medium enterprises (SMEs), to achieve an economic society 5.0. Economic Society 5.0 has a close relationship with companies and super-innovative communities (Konno, Schillaci, 2021), emphasizing digital factors in corporate governance. Competition in digital platforms is relatively high, so it is necessary to use technology for innovation in digital platforms. Digital innovations have become an integral part of digital users whose use depends on their level of internet skills (Dutta, Sarma, 2021). The company's digital innovation is measured by the ownership, excellence, uniqueness and novelty of its digital products (Khin, Ho, 2019).

The research (Bongomin et al., 2020) covered six countries and their six initiatives were compared in terms of their goals and focus areas of the 4.0 technology industry. Countries that were the subject of research are Germany, the United States, China and Japan because of their exceptional economic and technological powers, while India and Mexico were also chosen because of their unprecedented technological leap in the 21st century. These two countries managed to ”jump” directly from Industry 2.0 to Industry 4.0. Digital Strategy 2025 and High Technology Strategy 2025 (DS & HTS 2025) are two complementary Industry 4.0 programs recently launched. The Digital Strategy 2025 initiative was launched in 2016 and represents central focus is on the digitalization of everything, including products and small and medium-sized enterprises in order to achieve a competitive advantage. The goal of MIC 2025 is to comprehensively improve, consolidate and balance the Chinese manufacturing industry, making it a global leader in innovation and manufacturing. The Make in India flagship initiative aims to aggressively transform India into a manufacturing and technology center. With its Industry 4.0 initiatives, Mexico strives to be competitive with technologically advanced manufacturing superpowers (UK, Germany, USA, etc.).

The subject of the research (Alvarez-Aros, Bernal-Torres, 2021) was technological competitiveness and new technologies of Industry 4.0 and Industry 5.0 in developed and developing countries. Smart manufacturing systems are recognized in both economies as the primary element of Industry 4.0. However, developed economies are building and deploying more advanced and technology-oriented and 5.0-oriented technologies, such as automation, artificial intelligence, deep learning, machine learning, information and communication technologies, virtual reality and augmented reality. Virtual reality and augmented reality are essential elements for the development of new industrial waves, as they will support decision-making and environmental manipulation (Bednar, Welch 2019).

The national competitiveness of the Serbian economy is inadequate in terms of developed countries. Domestic companies strive to fight for competitive advantage in the international market, but they are limited by business factors such as low quality and productivity, inadequate application of modern technologies, lack of knowledge, etc. The concept of sustainable development strives to improve the quality of life and work of all citizens of the Republic of Serbia. Serbia is a developing country that does not have enough financial resources for fast and efficient implementation of the sustainable development strategy. The domain of education is one of the key factors in achieving the concept of

sustainable development (Pejić et al., 2019). When it comes to the goals of sustainable development in the domestic economy, it can be seen that there is a high level of unemployment, knowledge and technologies are not applied adequately in all industries, agriculture is based on traditional technology without applying the concept of smart technology. In addition, the poverty rate is rising, youth unemployment is falling, but a large number of young people are leaving the country, gender equality has improved, inadequate exploitation and water management, little progress on sustainable industrialization and investment in technical-technological research and development, inadequate recycling rates, improvements in partnerships with other countries on technological research and information development (Bakator et al., 2021).

CONCLUSION

Society 5.0 models a new cyber-physical environment through the implementation of Industry 4.0 and Industry 5.0, which improve the connections between people, things, human subjects and technologies in an advanced cyberspace environment. The era of society has become the era of unification of people and technology, that is, it describes the period when people and their way of thinking are trapped between material needs and the desire for existence. Technology has become a necessity that all people must meet. Societies 5.0 with a sustainability approach proposes to face the challenges of modern society through sustainable digital innovation to increase the potential of individual-technology relationships in order to promote the improvement of people's quality of life through a super-intelligent society - society 5.0.

It can be concluded that in order to achieve the goals of this super society, humanity is redirecting projects to progress towards the era of industrial and social progress. In order for domestic economy and their economic entities to improve their competitiveness and sustainability, it is necessary to implement some of the initiatives of the concept of society 5.0. First, to focus on environmental protection through efficient use of resources and water protection, as well as protection of human life and health through an adequate health care system. The application of advanced technologies in companies would ensure a sustainable level of business. The business of a company should be in line with the goals of sustainable development in order to ensure the prosperity and development of society and the economy as a whole.

REFERENCES

Alvarez-Aros, E. L., & Bernal-Torres, C. A. (2021). Technological competitiveness and emerging technologies in industry 4.0 and industry 5.0. Anais da Academia Brasileira de Ciências, 93.

Aquilani, B., Piccarozzi, M., Abbate, T., & Codini, A. (2020). The role of open innovation and value co-creation in the challenging transition from industry 4.0 to society 5.0: Toward a theoretical framework. Sustainability, 12(21), 8943.

Arıcı, T., & Kitapci, H. (2021). An investigation of the impact of the concept of society 5.0 on total quality management: the future of human-oriented technology studies social quality. Proceedings on Engineering, 3(1), 81-92.

Bagautdinova N.G. & Nikulin R.A. (2018). Model konkurentosposobnosti organizatsii v usloviyakh informatsionnoj ekonomiki [Model of competitiveness of an organization in the conditions of information economy]. Biznes. Obrazovanie. Pravo. Vestnik Volgogradskogo instituta biznesa - Business. Education. Right. Bulletin of the Volgograd Institute of Business. 3 (44), 18-25.

Bakator, M., Đorđević, D., Ćoćkalo, D., Bešić, C., & Milosavljev, D. (2021). Achieving sustainable development through the concept of Society 5.0. XI International Conference Industrial Engineering and Environmental Protection 2021 (IIZS 2021)October 07-08, 2021, Zrenjanin, Serbia, 265-269.

Bakator, M., Đorđević, D., Ćoćkalo, D., Nikolić, M., & Vorkapić, M. (2018). Lean startups with industry 4.0 technologies: Overcoming the challenges of youth entrepreneurship in Serbia. Journal of Engineering Management and Competitiveness (JEMC), 8(2), 89-101.

Bednar, P. M., & Welch, C. (2020). Socio-technical perspectives on smart working: Creating meaningful and sustainable systems. Information Systems Frontiers, 22(2), 281-298.

Bongomin, O., Nganyi, E. O., Abswaidi, M. R., Hitiyise, E., & Tumusiime, G. (2020). Sustainable and dynamic competitiveness towards technological leadership of industry 4.0: implications for East african community. Journal of Engineering, 1-22.

Büchi, G., Cugno, M., & Castagnoli, R. (2018). Economies of Scale and Network Economies in Industry 4.0. Symphonya, Emerging Issues in Management, 2, 66-76.

Demir, K. A., Döven, G., & Sezen, B. (2019). Industry 5.0 and human-robot co-working. Procedia computer science, 158, 688-695.

Dubnytskyi, V. I., & Pysarkova, V. R. (2020). The digital economy of the region in the context of conditions to increase its competitiveness, Ejибинічнип вісник ДВНЗ УДХТУ, 2 (12), 22-28.

Dutta, D., & Sarma, M. K. (2020). Adoption of Digital Innovation - Formulating Adopter Categories and Levels of Adoption in a Digital Sphere in an Emerging Economy. International Journal of Innovation and Technology Management, 17(08), 2050059.

Frederico, G. F. (2020). Supply Chain 5.0 - The Reconciliation between Humans and Machines. Supply Chain Management Review, 2nd ed.; Peerless Media: Framingham, MA, USA.

Fukuyama, M. (2018). Society 5.0: Aiming for a New Human-Centered Society. Japan Spotlight, 4, 47-50.

Hayashi, H., Sasajima, H., Takayanagi, Y., & Kanamaru, H. (2017, September). International standardization for smarter society in the field of measurement, control and automation. In 2017 56th Annual Conference of the Society of Instrument and Control Engineers of Japan (SICE) (pp. 263-266). IEEE.

Higashihara, T. (2018), A Search for Unicorns and the Building of "Society 5.0", World Economic Forum, Davos.

Holroyd, C. (2022). Technological innovation and building a 'super smart'society: Japan's vision of society 5.0. Journal of Asian Public Policy, 15(1), 18-31.

Khin, S., Ahmad, N. H., & Ramayah, T. (2012). The integrated effect of strategic orientations on product innovativeness: moderating role of strategic flexibility. Procedia-Social and Behavioral Sciences, 65, 743-748.

Konno, N., & Schillaci, C. E. (2021). Intellectual capital in Society 5.0 by the lens of the knowledge creation theory. Journal of Intellectual Capital, 22 (3), 478-505.

Michna, A., & Kmieciak, R. (2020). Open-mindedness culture, knowledge-sharing, financial performance, and industry 4.0 in SMEs. Sustainability, 12(21), 9041.

Nakanishi, H. (2019), Modern Society Has Reached Its Limits - "Society 5.0" Will Liberate us, WorldEconomic Forum, Davos.

Onday, O. (2019). Japan's society 5.0: Going beyond Industry 4.0. Business and Economics Journal, 10(2), 1-6.

Pejić, S., Radivojević, R., & Marčeta, M. (2019). Razvoj strategije obrazovanja za održivi razvoj u Srbiji. XXV Skup Trendovi razvoja: Kvalitet visokog obrazovanja, Kopaonik, 1-4.

Pereira, A. G., Lima, T. M., & Santos, F. C. (2020). Industry 4.0 and Society 5.0: opportunities and threats. International Journal of Recent Technology and Engineering, 8(5), 3305-3308.

Potočan, V., Mulej, M., & Nedelko, Z. (2020). Society 5.0: Balancing of Industry 4.0, economic advancement and social problems. Kybernetes, 50 (3), 794-811.

Rahmawati, M., Ruslan, A., & Bandarsyah, D. (2021). The Era of Society 5.0 as the unification of humans and technology: A literature review on materialism and existentialism. Jurnal Sosiologi Dialektika, 16(2), 151-162.

Salimova, T., Guskova, N., Krakovskaya, I., & Sirota E. (2019). From Industry 4.0 to Society 5.0: Challenges for Sustainable Competitiveness of Russian Industry. IOP Conference Series: Materials Science and Engineering, 497,1 -7.

Salimova, T., Vukovic, N., & Guskova, N. (2020). Towards sustainability through Industry 4.0 and Society 5.0. International Review, (3-4), 48-54.

Savaget, P., Geissdoerfer, M., Kharrazi, A. & Evans, S. (2019), The theoretical foundations of sociotechnical systems change for sustainability: a systematic literature review, Journal of Cleaner Production, 206, 878-892.

Savaneviciene, A., Statnicke, G., & Vaitkevicius, S. (2019). Individual Innovativeness of Different Generations in The Context Of The Forthcoming Society 5.0 In Lithuania. Inzinerine Ekonomika-Engineering Economics, 30(2), 211 - 222.

Serpa, S., & Ferreira, C. (2018). Society 5.0 and social development: Contributions to a discussion. J. Manag. Organ. Stud. 2018, 5, 26–31.

Shiroishi, Y., Uchiyama, K. & Suzuki, N. (2018), Society 5.0: for human security and well-being, Computer, 51 (7), 91-95

Zengin, Y., Naktiyok, S., Kaygın, E., Kavak, O., & Topçuoğlu, E. (2021). An investigation upon industry 4.0 and society 5.0 within the context of sustainable development goals. Sustainability, 13(5), 2682.

PERSPECTIVES ON THE STRENGTHENING OF THE SERBIAN EXPORT COMPETITIVENESS IN THE POST-COVID PERIOD

Elena Jovičić
Institute of Economic Sciences, Belgrade Serbia
E-mail: elena.jovicic@ien.bg.ac.rs
Darko Marjanović
Institute of Economic Sciences, Belgrade, Serbia

ABSTRACT

International trade plays a crucial role in fostering economic development, which is particularly important for relatively small open economies like Serbia. Apart from faster growth, international trade enables countries to improve productivity and provide higher income and more opportunities to domestic companies and citizens. The Covid-19 pandemic had a tremendous negative impact on global trade development. World merchandise trade recorded a decline of 7.4% in 2020, but it was recovering fast, achieving a pre-crisis level by the end of 2021. Serbian trade declined 3.4% in 2020, while it marked a strong recovery with a growth of 25.5%. Despite a recovery and remarkable growth rates, a non-diversified export structure with a high presence of low value-added products, a low level of participation in GVCs, absence of a strategic approach to export promotion remain the main challenges Serbian trade faces. In order to enhance export competitiveness, it is necessary to make attempts for export diversification by attracting investments in strategically important industries and sectors. Furthermore, it is essential to develop an active and well-conceived export promotion policy based on appropriate measures and tools to support the export activities.

Key words: Serbia, Trade, Exports, Competitiveness.

INTRODUCTION

International trade is considered one of the main drivers of economic and social development (Bakari & Mabrouki, 2017). The results of most empirical research show that openness to international trade encourages economic growth (Marjanović, D. & Domazet, I. 2018). Apart from faster growth, international trade enables countries to improve productivity and provide higher income and more opportunities to domestic companies and citizens. According to Eberhard-Ruiz and Calabrese (2018), the level of export competitiveness is of great importance for a country's effective participation in international trade, as well as eventual management of balance of trade distress. Export competitiveness is the ability of a country or firm to produce and sell goods and services in foreign markets at a price and quality that ensure long-term viability and sustainability (Gaglio, 2015). Exports contribute to higher levels of specialization in production, which leads to higher productivity and increased economic growth (Nguyen, 2011). As exports grow, resources are allocated more efficiently by shifting factors to more productive export sectors. It is considered a key indicator of the success of firms through increased export of value-added goods and services (Atkinson, 2013). Yet, export-led economic growth is crucial for enhancing economic growth in developing countries (Hakobyan, 2017), and it is particularly important for small or relatively small countries (such as Serbia), which are more dependent on cooperation with foreign partners (Baranenko & Đukić, 2012).

International trade has been rising steadily during the last decade. But the situation was dramatically altered by the Covid-19 pandemic when world merchandise trade recorded a decline of 7.4% in 2020, which is the most considerable annual decrease since 2009 (fell by 22%) (UNCTAD, 2021). After a sharp decline, world trade recovered in 2021. But although total world trade has reached pre-pandemic levels, a significant imbalance among trade partners and products remained at the end of 2021, and not all

accumulated losses from previous steep declines have been offset (OECD, 2022). There were very heterogeneous trade impacts on specific goods, services and trade partners, that created pressure on sectors and supply chains. Furthermore, these impacts and pressures were much more prominent than during the global financial crisis and signified high uncertainty and adjustment costs across products, sources and destinations.

When it comes to Serbia, the Serbian merchandise trade also declined 3.4% in 2020, while it marked a strong recovery with a growth of 25.5% in 2021. Despite a recovery and remarkable growth rates, there are still many challenges Serbian trade faces. In this regard, the paper aims to investigate current global trends' impact on the development of Serbian trade flows (with a special focus on exports). Also, the paper attempts to identify the main obstacles and challenges Serbian trade/exports face and explore perspectives on the strengthening of Serbian export competitiveness in the following, post-covid period.

METHODOLOGY

The analysis was carried out based on data from the Republic Statistical Office of Serbia and the National Bank of Serbia. Merchandise trade data is presented in current euros and covers the period from 2017 to 2021. The changes in the trade structure are observed in terms of SITC (Standard International Trade Classification). The average annual growth rates for trade and exports are based on geometric mean rate calculation.

SERBIAN TRADE FLOWS DEVELOPMENT

In the period 2017 – 2021, the total trade of Serbia has been almost steadily growing, except in 2020 (Figure 1). Compared to 2017, total trade increased by 45.8%; exports and imports grew by 43.7% and 47.5%, respectively. The average annual growth rate of exports was 10% and 11% in terms of imports. In 2021, Serbia recorded a trade deficit of 6980.5 million euros, which is almost twice as high as in 2017. The export-import coverage ratio stayed at a relatively high level of 75.6% in 2021, but a declining trend was recorded from 2017 to 2020. The exports to GDP ratio slightly increased from 38.4% in 2017 to 40.6% in 2021, but the ratio (40.6%) does not represent a desirable level despite the upward trend.

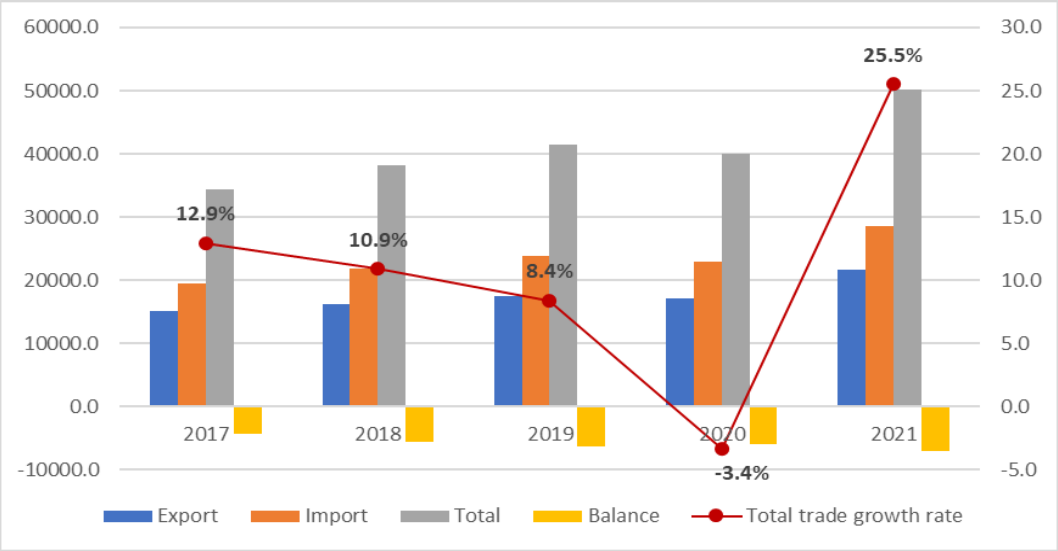


Figure 1: Dynamics of Serbian trade in goods, 2017-2021
Source: Authors' compilations based on Statistical Office of the Republic of Serbia data

When it comes to the impact of the Covid-19 pandemic, the exports declined by only 2.7% year-over-year, while the import was lower by 3.8% in 2020. Serbia's trade deficit was reduced despite a reduction in

external demand and a significant increase in medical products and devices imports. Within the total exports of goods, exports of manufactured products decreased by 5.0%, primarily due to lower external demand and disruption of global production chains. On the other hand, exports of agricultural products after a pleasant growing season grew by 19.8%. The data shows that the Serbian trade, generally, was not affected so severely as trade in many other countries over the world. Furthermore, in 2021, total trade experienced a robust recovery, amounting to 50222 million euros, which is an increase of 25.5% compared to 2020. A remarkable growth was recorded in both exports (26.8%) and imports (24.6%).

According to the analysis of the data on the trade structure in terms of SITC, the structure of Serbian exports has not significantly changed in the last five years, except for sector 2 - Raw materials, except fuels, which share grew more than three times compared to 2017 (Table 1). The Machinery and transport equipment and Miscellaneous manufactured articles remain the main sections with a share of 26.7% and 22.4% in total exports of goods, followed by Food and live animals, Miscellaneous manufactured articles and Chemicals (14.1%, 11.4% and 10.3%, respectively).

The most highly affected by Covid-19 pandemic sectors in 2020 were: Commodities and transactions, n.e.s (decline by 17.9% compared to 2019), Mineral fuels and lubricants (-16.7%), and Manufactured goods classified by materials (-14.3%), or, in other words, sectors that experienced reduced demand for goods including sectors that were more integrated into the global supply chains. Nevertheless, all sectors of SITC recorded positive growth rates in 2021, showing signs of recovery.

Table 1: The structure of the Serbian exports of goods by sectors of SITC, 2017-2021, in million euros

	2017	**2018**	**2019**	**2020**	**2021**
Total exports	15050.8	16282.0	17533.4	17054.5	21620.8
0 Food and live animals	2035.5	2052.1	2304.9	2580.7	3054.4
1 Beverages and tobacco	438.3	456.2	520.5	606.2	666.3
2 Raw materials, except fuels	532.8	562.1	558.2	677.4	1423.4
3 Mineral fuels and lubricants	382.5	492.9	469.1	390.8	630.4
4 Animal and vegetable oils and fats	166.3	143.0	198.8	193.5	259.7
5 Chemicals	1390.9	1575.1	1614.3	1694.8	2230.2
6 Manufactured goods classified by materials	3553.2	4039.9	4268.8	3657.5	4838.6
7 Machinery and transport equipment	4220.8	4515.1	4979.5	4821.7	5766.7
8 Miscellaneous manufactured articles	1997.6	2091.2	2296.7	2167.2	2458.9
9 Commodities and transactions, n.e.s	332.9	354.2	322.6	264.7	292.3

Source: Authors' compilations based on Statistical Office of the Republic of Serbia data

Regarding the main export destinations, the most important trade partners (top 10) of Serbia in 2021 were: Germany (12.7% of total exports), Italy (8.5%), Bosnia and Herzegovina (7.2%), Romania (5.5%), Hungary (5.0%), the Russian Federation (3.9%), China (3.8%), Montenegro (3.8%), North Macedonia (3.8%) and Poland (3.5%). Compared to 2017, there were several changes recorded. Firstly, the share of China and Hungary in total exports remarkably increase (from 0.2% to 3.8%, and from 3,2% to 5.0%, respectively). Secondly, the share of Italy and the Russian Federation decreased (from 13.2% to 8.5% and from 5.9% to 3.9%).

DISCUSSION

Due to the high value of the trade-to-GDP ratio (110% in 2020 according to WB estimations), Serbia is recognized as an open economy. The high degree of trade openness has been followed by steady export growth, enhanced by expanding exports supply with a gradually increasing share of knowledge-intensive products. Namely, according to the UNECE study (2021), export-oriented manufacturing enterprises are exhibiting increased engagement in knowledge/technology-intensive activities, with many registering high scores on both the product complexity index (PCI), as well as the economic complexity index (ECI). Serbia's score, for instance, was estimated at 0.68 in 2020, placing it in the 37th position in a ranking of 127 countries.

Despite certain improvements in trade structure, as well as significant achievements in generating inclusive trade-led growth, there are some challenges the Serbian exports still face. First of all, the substantial problem remains the non-diversified export structure - although there were recorded some positive changes mentioned above, trade structure is characterized by a high presence of low value-added products. Export of knowledge-intensive products is still on an insufficient level, while exports of raw materials and lower value-added products, such as insulated wire, steel, copper, corn, wheat, tobacco, apples, and raspberries are growing. As Frias et al. (2019) mentioned, Serbia introduced only 47 new export goods between 2008 and 2017, and the complexity of its exports did not increase.

One of the main challenges could be considered the fact that more than half of the Serbian exports originate from foreign-owned companies that do not use the services and products of Serbian suppliers on a sufficient level. For instance, domestic inputs, except for labor and energy, accounted for only 9% of input costs in 2019, while almost 30 percent of the increase in exports included the imports of goods for processing in Serbia in order to be exported later to the country of origin – which means there are few opportunities for overflowing positive effects and participation of local companies in global value chains (Rabrenović, 2020).

In addition, the low level of participation of Serbian companies in GVCs, the high presence of foreign-owned companies in the exports, the low level of investments in new technologies and the absence of a strategic approach to export promotion should be mentioned when indicating the obstacles that could also prevent the growth of export competitiveness.

In order to overcome the main challenges, it is essential to focus the Serbian exports policy approach on fostering exports competitiveness, primarily by the diversification of the exports structure, which means attracting investments in strategically important industries and sectors producing goods of higher stages of processing and thus bringing higher added value. In this regard, it is important, among other things, to increase investments in R&D activities.

Further improvements are necessary within trade facilitation and an overall raising openness of the domestic economy. Hence, Serbia should continue the process of creating a better environment for exporters, which implies improvement of domestic regulations and the institutional framework, stability and non-discrimination of the exchange rate, sound monetary and fiscal policy, reducing the level of corruption and development of the business climate, upgrading export-supporting services, etc. (Ignjatović, 2020). Of great importance is also the implementation of an adequate policy of export-oriented domestic companies' support, especially for small and medium enterprises.

When it comes to the prospects of the future development of Serbian exports, since Serbia has succeeded in providing of adequate response to the crisis provoked by the Covid-19 pandemic, which led to the achievement of macroeconomic stability and recovery of the main macroeconomics indicators, it could be expected that trade, as well as exports, will continue to increase in the forthcoming period. The global trade revival, as well as the fact that the Covid-19 situation appears to be relatively stable and on a downward trend, also argues in favor of that assumption.

CONCLUSION

The paper's purpose was to investigate the impact of the Covid-19 pandemic on the Serbian trade flows and exports development. Special attention was paid tempts to identifying the main obstacles and challenges Serbian trade/exports face and exploring perspectives on the strengthening of Serbian export competitiveness in the following period.

According to the conducted analysis, Serbian trade was not affected as severely as trade flows in many other countries worldwide. Furthermore, in 2021, total trade experienced a robust recovery. A remarkable growth was recorded in both exports and imports as well. The most highly affected by Covid-19 pandemic

sectors in 2020 were: *Commodities and transactions, n.e.s*, *Mineral fuels and lubricants* and *Manufactured goods classified by materials*, or, in other words, sectors that experienced reduced demand for goods, including sectors that were more integrated into the global supply chains. Nevertheless, all sectors of SITC recorded positive growth rates in 2021, showing signs of recovery.

Despite certain improvements in trade structure and significant achievements in generating inclusive trade-led growth, there still remain challenges that could negatively impact Serbian economy competitiveness and hinder opportunities to increase exports. The most important obstacles are defined as follows: a non-diversified export structure with a high presence of low value-added products, a high presence of foreign-owned companies in exports, a low level of participation in GVCs, absence of a strategic approach to export promotion, the low level of investments, etc.

In order to enhance export competitiveness, it is necessary to make attempts for export diversification by attracting investments in strategically important industries and sectors. Furthermore, it is essential to develop an active and well-conceived export promotion policy based on appropriate measures and tools to support the export activities.

ACKNOWLEDGMENT

This paper is financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

REFERENCES

Antončič, B., & Hisrich, R. D. (2001). Intrapreneurship: Construct refinement and cross-cultural validation. *Journal of Business Venturing*, 16 (5), 495-527.

Antončič, B., Cardon, M. S., & Hisrich, R. D. (2004). Internationalizing corporate entrepreneurship: The impact on global HR management. In Katz, J. A., & Shepherd D. A. (Eds.), *Corporate Entrepreneurship*: *Advances in Entrepreneurship, Firm Emergence and Growth, Vol. 7*. Oxford, UK: Elsevier, JAI, 173-197.

Baranenko, E., & Đukić, M. (2012). Ways for enhancement of export activities. In Andrade, J. S., Simões, M. C.N., Stošić, I.,| Erić, D.,| Hanić, H. (Eds.), *Managing structural changes: trends and requirements*, Coimbra, Portugal: Faculty of Economics, 520-536.

Frias, J., Shimbov, B., Davies, E., & Ek, C. (2020). Serbia's New Growth Agenda: Increasing Exports. Country Economic Memorandum;. World Bank, Washington, DC. © World Bank.

Hisrich, R. D., Peters, M. P., & Shepherd, D. A. (2008). *Entrepreneurship. 7th ed.* Boston, MA: McGraw-Hill.

Ignjatović, J., Kisin, J., & Brajković, M. (2020). Exports as a trigger of economic growth of the Republic of Serbia. Poslovna ekonomija, 18(2), 19-37.

Marjanović, D. & Domazet, I. (2018). *Improving macro competitiveness - fiscal aspects*. Belgrade: Institute of Economic Sciences.

National Bank of Serbia. Available on: https://nbs.rs/en/drugi-nivo-navigacije/statistika/

Nguyen, H.T. (2011). *Exports, Imports, FDI and Economic Growth*. The University of Colorado at Boulder, Working Paper No. 11-03.

OEC database. Available on: https://oec.world/en/profile/country/srb#most-complex-products

OECD. (2022). International trade during the COVID-19 pandemic: Big shifts and uncertainty. Available on: https://www.oecd.org/coronavirus/policy-responses/international-trade-during-the-covid-19-pandemic-big-shifts-and-uncertainty-d1131663/

Rabrenović, J. (2020). Srpski izvoz bez Srba. *Politika*. Available on: https://www.politika.rs/scc/clanak/446135/Ekonomija/Srpski-izvoz-bez-Srba

Statistical Office of the Republic of Serbia. Available on: https://www.stat.gov.rs/en-us/

UNCTAD. (2021). Global merchandise trade exceeds pre-COVID-19 level, but services recovery falls short. Available on: https://unctad.org/news/global-merchandise-trade-exceeds-pre-covid-19-level-services-recovery-falls-short

UNECE. (2021). Regulatory and Procedural Barriers to Trade in Serbia: Needs Assessment. Available on: https://unece.org/sites/default/files/2021-06/ECE-TRADE-460_0.pdf

World Bank database. Available on: https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS

THE ROLE OF INSURANCE COMPANIES IN THE SERBIAN FINANCIAL SYSTEM

Stevan Luković
University of Kragujevac, Faculty of Economics, Serbia
E-mail: slukovic@kg.ac.rs
Miloš Pjanić
University of Novi Sad, Faculty of Economics Subotica, Serbia
Božidar Čakajac
University of Kragujevac, Faculty of Economics, Serbia

ABSTRACT

Insurance companies play an important role in the global financial system. Their importance is particularly pronounced in market-oriented financial systems characterized by a less dominant role of commercial banks compared to capital markets. Hence, the countries with market-oriented financial systems have the most developed insurance markets. On the other hand, in the Republic of Serbia, due to the bank-oriented nature of the financial system, the share of insurance companies in total financial system assets is much smaller. Also, the Serbian insurance market remains underdeveloped both due to the low domestic population awareness of the importance of insurance and decades-long inheritance of the financial system design in which banks were considered the most important financial institutions. This is supported by the indicators that show the share of insurance companies in the assets and capital of the domestic financial system, but also by other parameters, such as the number of employees and diversification of the sales network.

Key words: Insurance companies, Financial system, Republic of Serbia.

INTRODUCTION

The insurance sector, along with the banking sector and the capital market, is a very important element of the financial system. However, it should be noted that the position and importance of insurance in modern financial systems varies depending on the characteristics of the financial system. Thus, insurance companies play an important role in market-oriented financial systems in which funds are raised primarily in capital markets rather than in the banking sector (Grbić, 2019). On the other hand, in bank-oriented financial systems, the banking sector dominates over the capital market and insurance sector. Looking at transition economies, including the Republic of Serbia, the common feature of their financial systems is the dominant role of commercial banks, underdeveloped capital markets and moderately developed insurance markets (Čakajac&Luković, 2020). The primary factor that caused the underdevelopment of the insurance market in transition economies is related to the reform process mostly directed towards the banking sector, while the importance of insurance and capital markets was practically marginalized.

In accordance with the above, the paper discusses the role and importance of the insurance sector in the Republic of Serbia. The aim of the research is to show the extent to which insurance companies are represented in the Serbian financial system compared to banking sector and other financial institutions. Also, the paper aims to identify the key participants in Serbian insurance sector. Given that the presence of foreign financial institutions is common for the financial systems of small and open economies, the paper seeks to determine the extent to which this trend is present in Serbian insurance market.

THE POSITION OF THE INSURANCE SECTOR IN THE FINANCIAL SYSTEM OF SERBIA

The simple analysis of the structure of the Serbian financial system reveals its extremely bank-oriented nature, given that commercial banks have a dominant share in the financial system both in terms of total assets and capital (Grbić&Luković, 2020). Thus, by looking at the total assets criterion, Table 1 shows that commercial banks have a dominant share that in most years during the observed period (2004-2020) exceeds 90%. In the second position are insurance companies whose share in total assets is far smaller compared to the banking sector, although since 2007 an increase in the share of insurance companies has been evident. The share of the remaining two groups of financial institutions - leasing companies and voluntary pension funds - is practically negligible.

Table 1: The structure of Serbian financial system (in %)

	Total assets (%)				**Total capital (%)**			
	Banks	**Insurance companies**	**Leasing**	**Voluntary pension funds**	**Banks**	**Insurance companies**	**Leasing**	**Voluntary pension funds**
2004	90.5	**5.5**	4.0	-	85.8	**13.5**	0.7	-
2005	88.8	**5.3**	5.9	-	85.8	**12.7**	1.5	-
2006	90.4	**4.3**	5.3	-	89.8	**8.6**	1.6	-
2007	90.2	**4.1**	5.5	0.2	91.5	**6.9**	1.6	-
2008	89.3	**4.3**	6.2	0.2	93.0	**5.6**	1.4	-
2009	90.8	**4.2**	4.7	0.3	92.1	**6.0**	1.9	-
2010	91.8	**4.2**	3.6	0.4	92.5	**6.0**	1.5	-
2011	92.4	**4.4**	2.8	0.4	93.0	**5.6**	1.4	-
2012	92.6	**4.5**	2.3	0.6	93.2	**5.6**	1.2	-
2013	92.4	**4.8**	2.2	0.6	93.5	**5.6**	0.9	-
2014	92.0	**5.2**	2.0	0.8	93.6	**5.3**	1.1	-
2015	91.5	**5.8**	1.8	0.9	92.1	**6.7**	1.2	-
2016	91.1	**6.1**	1.9	0.9	91.5	**7.3**	1.2	-
2017	90.7	**6.3**	2.0	1.0	91.3	**7.4**	1.3	-
2018	90.2	**6.7**	2.1	1.0	90.5	**8.2**	1.3	-
2019	90.1	**6.6**	2.3	1.0	89.7	**9.1**	1.2	-
2020	91.0	**6.0**	2.2	0.8	89.3	**9.6**	1.2	-

Source: National Bank of Serbia, The insurance sector in Serbia, Annual Reports for 2004-2020 period

Almost identical conclusions can be drawn when the share in total capital of the financial sector is considered. In 2004-2014 period a decrease in the insurance sector share in total capital of the financial system occurred. In 2004, the share of insurance companies in total capital amounted to 13.5%, while in 2014 they accounted for only 5.3%. However, since 2015, there has been a slow but continuous increase in share in total capital, although the share of banking sector has remained far higher than of insurance companies. The higher insurance sector share in total capital at the beginning of the observed period can be explained by the fact that in 2004 the largest number of insurance companies (40) operated on the Serbian insurance market, but that number decreased steadily in the rest of the observed period.

The key reasons that explain the minor position of the insurance sector in Serbian financial system are the inherited and historical circumstances that have influenced banks to be the most important institutions in the domestic financial system for decades. Insurance companies existed in Serbia for a long time, but they were not merely as important as banks, and such a situation has persisted to this day. An opportunity for changing these tendencies arose during the reform wave at the beginning of the new millennium, when the financial sector reform was marked as necessary step in establishing a modern market economy. However, the radical reform of the insurance market has not been implemented, although the reform processes were necessary given the following problems that characterized the domestic insurance market (Ostojić, 2004):

- Lack of the effective protection of the insured;
- The problems concerning the insurance claim payment process;
- Lack of trust in insurance companies;
- Inadequate risk management mechanisms;
- Weak portfolio diversification.

Certain changes took place in 2004 when the Law on Insurance was adopted, which transferred the powers of supervision over insurance business to the National Bank of Serbia (Šulejić, 2005). The mentioned Law was the first step in reforming the insurance market, since far more serious monitoring of the insurance market was established.

By observing the 2004-2020 period, it can be seen that the number of insurance companies had been halved in Serbia, since 40 insurance companies were engaged in domestic insurance sector in 2004, but only 20 at the end of 2020. This was certainly influenced by much stricter control by the National Bank of Serbia with regard to requirements of risk management procedures and the appropriate amounts of capital supporting the assumed risks. The trend of decreasing the number of insurance companies was interrupted between 2006 and 2013, since in this period the number of insurance companies increased by 11. However, since 2014 until the end of the observed period, there has been a continuous decrease in the number of insurance companies, mostly as a result of the takeover of smaller insurers by large companies.

The reform process undertaken in 2004 influenced the increase in public confidence in the domestic insurance sector over time (Rohrbach, 2007). This can be concluded on the basis of the dynamics of the total insurance premiums shown in Figure 1. Between 2004 and 2008 a continuous growth of total insurance premiums occurred. However, this period was followed by the emergence of Global financial crisis and the Eurozone debt crisis between 2009 and 2015 that significantly slowed down the further rise of the Serbian insurance market. Starting from 2015, the total insurance premiums continued to increase, with the premiums at the highest level at the end of 2020.

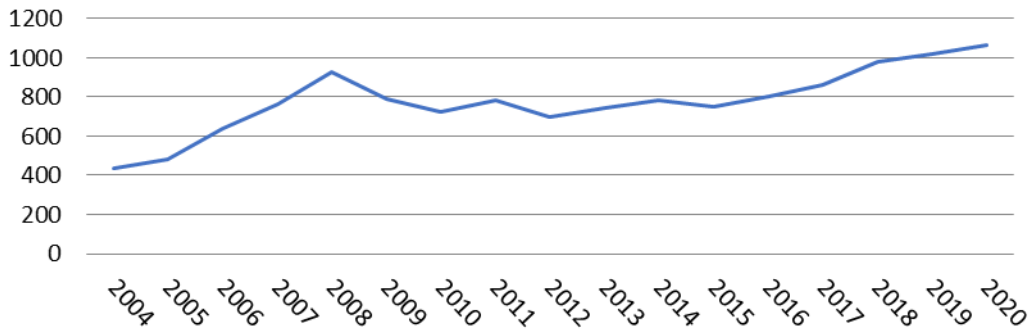


Figure 1. The total insurance premium in Serbia, 2004-2020 (million Serbian dinars)
Source: National Bank of Serbia, The insurance sector in the Republic of Serbia, Annual Reports for 2004-2020 period

SERBIAN INSURANCE MARKET PARTICIPANTS

According to the annual reports provided by the National Bank of Serbia, most of insurance companies in Serbia is engaged exclusively in insurance business. On the other hand, a significantly smaller number of insurers are engaged exclusively in reinsurance business, with an increase in the number of reinsurers from 2 in 2004 to 4 in 2020. Concerning the composition of companies dealing exclusively with insurance, it can be pointed out that the number of insurance companies that deal exclusively with life insurance decreased from 6 in 2004 to 4 in 2020. The number of non-life insurance companies also decreased from 16 in 2004 to only 6 in 2020.

In the period from 2007 to 2017, the largest number of insurance companies was engaged exclusively in non-life insurance, while in 2018-2020 period their number equaled the number of companies that jointly conduct the life and non-life insurance business. Although in 2004 the non-life insurance companies and companies that jointly conduct life and non-life insurance where prevalent compared to life insurance companies, in the successive years the diversification of insurance sector has occurred that resulted in life and non-life insurance being represented more evenly. This issue has had a positive impact on the development of domestic insurance market and greater availability of insurance products.

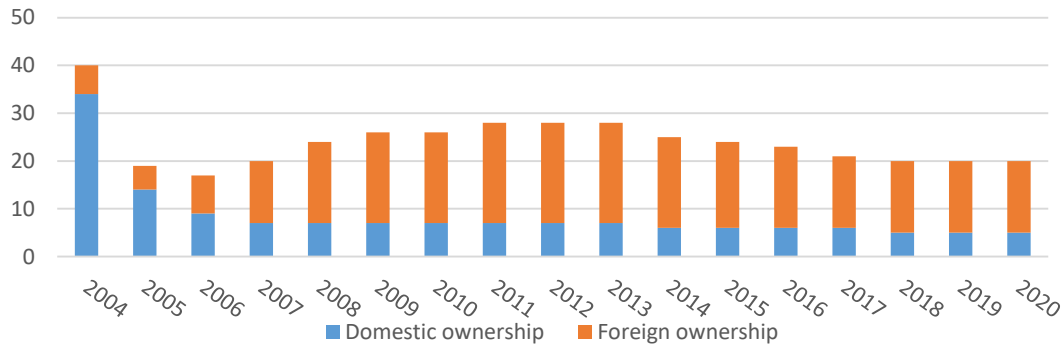


Figure 2. The ownership structure of insurance companies
Source: National Bank of Serbia, The insurance sector in the Republic of Serbia, Annual Reports for 2004-2020 period

When the ownership structure of insurance companies is taken into account, the reform process in the insurance market has made the domestic insurance market far more accessible to foreign insurance companies than was previously the case. As is the case with the banking sector, the arrival of foreign companies in the insurance sector should improve the quality of the insurance product offer, encourage competition and enable the introduction of new insurance products and greater satisfaction of insurance clients (Stojaković, 2017). In case of Serbia, this was reflected in the ownership structure that changed compared to the beginning of the observed period, which can be seen in Figure 2. In 2004-2006 period the domestic insurance market was mostly represented by domestic-owned insurance companies, regardless of whether they were state-owned or privately-owned companies. However, from 2007 to 2020, there was a change in the ownership structure in favor of foreign insurers. In 2020, 75% of insurance companies were foreign-owned, while only 25% were domestically-owned. The further analysis of foreign-owned insurance companies in 2020 shows that these companies are originating from Austria (25%) and Slovenia (15%), while only a few insurance companies come from Italy, Croatia, Russia, Hungary, the Netherlands, the Czech Republic and Ireland.

LARGEST INSURANCE COMPANIES IN SERBIA

As reported in Table 2, the largest insurance company in 2019-2020 period was Dunav Insurance which managed to further increase its share in total premiums in 2020 compared to 2019. The second place was held by Generali Insurance, and these two companies are the only ones that had more than 20% share in the total premium. It should be noted that in 2020 Generali Insurance recorded a decrease in share compared to 2019. In third place was the Austrian insurance company Wiener, which improved its ranking compared to 2019, when it occupied the fourth position. The fourth position in 2020 belonged to DDOR Insurance, which recorded a worse rank by one position than in 2019 due to the fact that the company achieved a slower increase in insurance premiums compared to Wiener. Finally, the fifth position was held by Triglav Insurance, which in both observed years had almost identical share in total premium.

Table 2. Five largest insurance companies in Serbia, 2019-2020

Insurance company	2019		2020	
	Share in total gross premiums (%)	Rank	Share in total gross premiums (%)	Rank
Dunav	26.4	1	27.0	1
Generali	21.5	2	20.1	2
Wiener	11.7	4	12.1	3
DDOR	11.8	3	11.9	4
Triglav	6.4	5	6.5	5

Source: National Bank of Serbia, The insurance sector in the Republic of Serbia, Annual Reports for 2019-2020 period

The further analysis of non-life insurance sector reveals that the largest insurance companies in Serbia are also major providers of non-life insurance products (Pjanić et.al, 2016). Based on the data shown in Table 3, the insurance company Dunav had the largest share in non-life insurance premiums 2020, while Generali held the second place. The third position belonged to DDOR, while the fourth position was held by Wiener. The fifth position belonged to Triglav, which is identical result as in the case of total insurance premiums.

Table 3: The share in non-life insurance premiums, 2019-2020

Insurance company	2019		2020	
	The share in non-life insurance premiums	Rank	The share in non-life insurance premiums	Rank
Dunav	31.3	1	31.9	1
Generali	19.1	2	17.8	2
DDOR	13.1	3	13.2	3
Wiener	8.9	4	9.0	4
Triglav	7.7	5	7.6	5

Source: National Bank of Serbia, The insurance sector in the Republic of Serbia, Annual Reports for 2019-2020 period

On the other hand, when looking at the life insurance market, Dunav, as the leading national insurance company, was only in the fourth position with approximately 15% share in total life insurance premiums. Generali had the upper hand when it comes to life insurance on the domestic market, but in 2020 this company recorded a decrease in share of life insurance premiums compared to 2019, which is shown in Table 4.

Table 4: The share in life insurance premiums, 2019-2020

Insurance company	2019		2020	
	Share (%)	Rank	Share (%)	Rank
Generali	29.4	1	27.4	1
Wiener	20.8	2	21.7	2
Grawe	15.0	3	14.8	3
Dunav	10.5	4	11.4	4
DDOR	7.4	6	7.8	5
Uniqa Life	7.6	5	6.5	6

Source: National Bank of Serbia, The insurance sector in the Republic of Serbia, Annual Reports for 2019-2020 period

The second place was held by Wiener, which reported an increase in market share in 2020 compared to 2019, while the third position was occupied by Grawe. Regarding the fifth and sixth position, the rank of insurance companies changed in the observed period, as DDOR improved its position by one place in 2020 compared to 2019, while Uniqa Life Insurance achieved a worse result by one position.
If the total assets share is taken as a criterion for ranking insurance companies, the situation is somewhat different. This can be seen from Table 5, which ranks insurance companies according to this criterion.

Table 5: The share in total assets

Insurance company	2019		2020	
	Share (%)	Rank	Share (%)	Rank
Generali	26.5	1	24.9	1
Dunav	18.5	2	19.6	2
Wiener	15.3	3	15.5	3
Grawe	11.9	4	12.0	4
DDOR	7.5	5	7.7	5

Source: National Bank of Serbia, The insurance sector in the Republic of Serbia, Annual Reports for 2019-2020 period

Thus, in both observed years, Generali had the highest share in total assets, while Dunav was in the second position. The third-ranked company, identical to its share in the total insurance premium, was the insurance company Wiener. What is important to note is certainly the fourth position in which Grawe found itself, which was not on the list of the largest insurance companies in the domestic market when considering the share in total insurance premiums. The fifth position was held by DDOR Novi Sad, which in the observed

period did not record significant changes in total assets' share. At last, the sum of individual shares in total assets shows that in 2020 top five insurance companies represented almost 80% of the entire Serbian insurance sector.

CONCLUSION

According to the aforementioned, it can be stated that the position of insurance companies in the Serbian financial system is largely marginalized. It should be noted that a significant improvement has been achieved compared to the beginning of the new millennium, which has led to the insurance sector receiving far more attention than was previously the case. The share of insurance companies in total capital and assets of domestic financial sector between 2004 and 2020 did not exceed the double-digit percentage, which unambiguously indicates the dominant position of banks, but also the low level of development of the domestic financial system. As in the case of the banking sector, the insurance sector is dominated by foreign-owned companies, as a result of the insurance market reform which has significantly facilitated access to the domestic market for foreign insurers.

In the period from 2004 to 2020, the largest number of insurance companies was engaged exclusively in non-life insurance business, and recently the number of insurance companies engaged in life insurance business has increased. This is very important as disparities in the structure of the insurance product provision are reduced, given that non-life insurance products still make up the dominant share of the range of available insurance products.

With regard to leading insurance companies on the market, it can be concluded that among the five leading insurance companies, four are foreign-owned, while the best listed domestic insurance company is Dunav Insurance. This company primarily deals with the non-life insurance, thanks to which it has the largest share in the insurance premiums. On the other hand, when the total insurance sector' assets share is taken into account, the leading position is held by Generali, whose market position is mainly supported by the life insurance products.

REFERENCES

Čakajac, B., & Luković S. (2020). The comparative analysis of the insurance sectors in developed countries and developing countries. The 25th Science Conference Regional development and demographic trends in the Southeast Europe. Faculty of Economics, University of Niš, 635-643

Grbić, M. (2019). Theoretical and methodological aspects of the interdependence between the financial system development and the economic growth. Faculty of Economics, University of Kragujevac

Grbić M., & Luković, S. (2020). Relationship between banks' credit activity and economic growth: An empirical research for the Republic of Serbia. *Industry*, 48 (2), 37-53

National Bank of Serbia (2019). The Insurance Sector in the Republic of Serbia - Report for 2019, available at https://nbs.rs/export/sites/NBS_site/documents/osiguranje/izvestaji/izv_IV_2019.pdf

National Bank of Serbia (2020). The Insurance Sector in the Republic of Serbia - Report for 2020, available at https://www.nbs.rs/export/sites/NBS_site/documents/osiguranje/izvestaji/izv_IV_2020.pdf

Ostojić, S. (2004). The importance of the insurance sector restructuring in Serbia. *Economic Development,* 47(1-2), 77-98

Pjanić M., Kalaš B., & Vasić N. (2016). The analysis of life insurance market in Serbia and countries in the region, *The Annals of the Faculty of Economics in Subotica*, 52(36), 145-160

Rohrbach, W. (2007). Reorganization and prospective of Serbian insurance market. *European Insurance Law Review,* 3-2007, 675-702

Stojaković, A. (2017). Insurance industry in selected transition countries. *The European Journal of Applied Economics*, 14(1), 32-47

Šulejić, P. (2005). The management in insurance companies according to the new regulations. *Law and Economy*, 42(5-8), 587-595

IMPACT OF THE COVID-19 PANDEMIC ON FOREIGN DIRECT INVESTMENT

Darko Marjanović
Institute of Economic Sciences, Belgrade, Serbia
E-mail: darko.marjanovic@ien.bg.ac.rs
Ivana Domazet
Institute of Economic Sciences, Belgrade, Serbia
Elena Jovičić
Institute of Economic Sciences, Belgrade, Serbia

ABSTRACT

Foreign direct investment is an important instrument in the economic growth and development of each national economy. At the same time, they are considered one of the key elements of the globalization process, as they significantly affect the mobility of production factors and world trade flows. Decisions on location choice and form of investment can be made by foreign investors depending on the political and economic situation in the country or the development and stability of specific sectors. The main goal of this paper is to determine whether the crisis caused by the COVID-19 virus has affected FDI mobility. That is, whether in 2020, as the first year of the pandemic, compared to the previous period (2018-2019), there were significant changes in FDI flows. The period covered by the research is from 2018 to 2020. The methodology applied in this research is based on a quantitative approach using available secondary data from the UNCTAD database. The results show that the crisis caused by the COVID-19 virus contributed to a significant reduction in the fluctuation of capital. Specifically, total FDI decreased by about 35% in 2020 compared to 2019, which indicates the negative impact of the COVID-19 crisis on FDI flows.

Key words: Foreign direct investment, Competitiveness, COVID-19, Crisis.

INTRODUCTION

For a country to be able to attract foreign capital, it must first provide a favorable investment climate. Therefore, it is very important that there are stable business conditions, political and social stability, favorable foreign trade, customs, foreign exchange treatment of joint ventures, available, reliable, trained workforce, and access to raw materials and other domestic sources of supply. Foreign companies usually have better operational solutions that can transfer to the domestic economy. These are most often large companies that often employ domestic suppliers and provide technical assistance, education and information needed to improve the quality of their products. Thus, they can benefit not only from increased revenue but also from increased production efficiency. On the other hand, by creating a good investment climate for foreign investors, the state creates additional opportunities for domestic companies and the development of new ideas. The positive impact of foreign direct investment is most pronounced in industry, service development, trade, and the transfer of new technologies. Industries of developing countries in which foreign capital has entered usually achieve good business results and stimulate the country's overall economic recovery (Marjanović & Domazet, 2021a). With the greater globalization of economic activities and the fluctuation of foreign capital, labor and services, countries have begun to "compete" with each other, which will attract as many economic entities as possible to its territory, and thus investments.

The effects of potential foreign investment on the economy are mostly positive, and the key evidence lies in their dynamic growth in recent decades. Until the beginning of 2020, we witnessed the success of some countries in Southeast Europe, which with relatively high inflows of foreign direct investment, experienced equally high export growth rates and attracted a significant number of large

projects of multinational companies, especially in the automotive industry. Countries that are competitive and provide foreign investors with an attractive investment environment have had significant economic growth in the last 20 years. However, all that has changed in the last two years due to the consequences of the COVID-19 pandemic.

LITERATURE REVIEW

Nowadays, foreign investments are a necessity and a need for most countries. This is one of the reasons why countries are trying to be more competitive to attract new investments. One of the most efficient ways to increase the country's comparative advantages is foreign direct investment (Marjanović & Domazet, 2021a; Fang et al., 2021). Foreign investment is one of the success factors of the national economy in the global market. Also, attracting foreign investment is necessary for most countries for stable growth (Marjanović & Domazet, 2018). Most developing countries are largely dependent on foreign direct investment and short-term external financing (Mehar, 2021). On the other hand, multinational companies strive to consider all aspects of potential investment and make timely decisions. In making investment decisions, foreign companies usually first take into account the country's economic position (Marjanović et al., 2022; Sharma, 2021). The foreign company chooses the location for investment based on the size of the country but also the potential risk that may adversely affect the company's operations (Garcia et al., 2013). If the level of competitiveness of a country is at a high level, a significant inflow of FDI can be expected, which to some extent may affect its economic growth and development (Marjanović & Domazet, 2021). According to Giofre (2021), portfolio investments react much faster to the interventions of the Government of one country, which in the future may be important to minimize the negative effects produced by the COVID-19 pandemic.

The COVID-19 pandemic has led to a global economic, trade, and investment crisis (Handoyo, 2020). It also caused great damage to the world economy, as it led to the closure of borders between countries, which affected the economic activities of most countries. The negative trend was particularly present in FDI inflows, rising unemployment, and declining foreign trade between countries (Petrovskaya et al., 2022). Using bilateral FDI flows from 173 home countries and 192 host countries, Hajakawa et al. (2022) measured the severity of the damage caused by COVID-19. Based on the analysis, they concluded that the COVID-19 pandemic in the host country had a negative impact on FDI in the manufacturing sector, while in the home countries, the impact on FDI was insignificant. On the other hand, in the services sector, the COVID-19 pandemic had a negative impact on FDI in both groups of countries, which was particularly pronounced in greenfield FDI.

DATA ANALYSIS AND FINDINGS

With the appearance of the COVID-19 virus, there was a significant increase in competition between the countries of a certain region, all aiming to create opportunities and thus provide additional inflows of foreign investment. This form of competition usually occurs between neighboring countries, with significant tax reforms in terms of the competitiveness of tax systems. It is extremely important for each country to be more competitive than the country in the immediate vicinity, which should contribute to a greater inflow of foreign investment. This is especially important during the global crisis when the fluctuation of free capital on the world market has significantly decreased.

The main feature of foreign direct investment is that it can significantly contribute to economic growth and development of a national economy. Therefore, one of the goals of each country is to provide a sufficient inflow of foreign direct investment. Until the advent of the COVID-19 virus, foreign direct investment had a growing trend globally. However, at the beginning of 2020, with the appearance of the COVID-19 virus, there was a reduction in the fluctuation of free capital on the world market. The main goal of this paper was to determine whether the emerging crisis caused by the COVID-19 virus affected the mobility of foreign direct investment. In order to obtain adequate answers and draw

certain conclusions, it was necessary to perform an analysis of FDI inflows in the two short-term observed periods. That is, to determine the fluctuation of FDI in the first year of the pandemic (2020) compared to the period before the pandemic (2018-2019). The period covered by this analysis was from 2018 to 2020. An appropriate methodology based on a quantitative approach was applied, while secondary data from the international UNCTAD database were used in the analysis.

In the first part of this paper, performed an analysis of FDI mobility at the global level. Table 1 shows the total amount of foreign direct in countries categorized according to their economic development (developed economies, developing economies, and transition economies) from 2018 to 2020.

Table 1: FDI inflows (millions of dollars)

	2018	2019	2020
Developed economies	707,649	748,999	312,170
Developing economies	692,480	723,385	662,562
Transition economies	36,604	57,844	24,160
World total	1,436,732	1,530,228	998,891

Source: authors, based on the UNCTAD data

Based on the presented data, the inflow of foreign direct investments in 2018 and 2019 amounted to about $ 700 billion, in both developed and developing countries. In the given period, countries in transition lagged significantly behind these countries regarding FDI inflows. However, compared to 2018, during 2019, FDI in these countries increased by about 58%. These countries have realized that creating an adequate investment climate that will favor FDI is necessary. That is a period when countries in transition were largely trying to adapt their markets to the demands of foreign investors. However, the COVID-19 pandemic has significantly affected FDI fluctuations globally. If we compare the inflow of FDI in the year before the pandemic and the first year of the COVID-19 pandemic, the situation is as follows:

a. the total amount of FDI in 2019 was $ 1,530 billion, while in 2020, the amount was $ 998 billion, which is a reduction of FDI by about 35%;
b. the total amount of FDI in developed countries in 2019 was $ 749 billion, while in 2020, this amount was $ 312 billion, which is a decrease in FDI by about 58%;
c. the total amount of FDI in developing countries in 2019 was $ 723 billion, while in 2020, this amount was $ 662 billion, which is a decrease in FDI by about 8%;
d. the total amount of FDI in transition countries in 2019 was $ 58 billion, while in 2020, this amount was $ 24 billion, which is a decrease in FDI by about 59%.

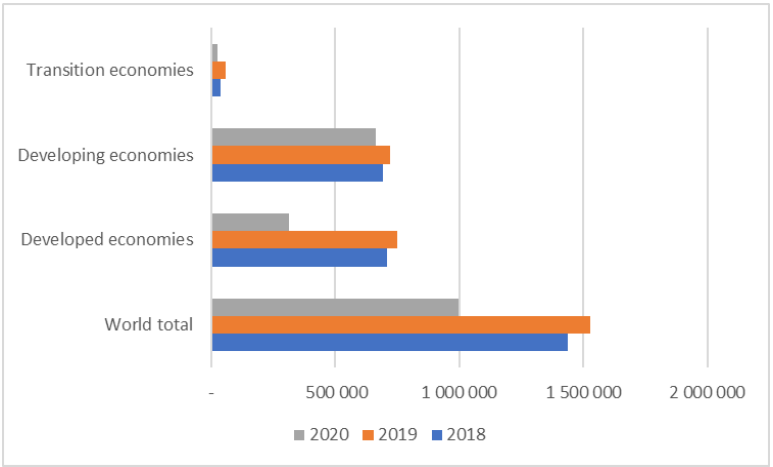


Figure 1: FDI inflows, 2018-2020 (millions of dollars)
Source: authors, based on the UNCTAD data

Based on all of the above, it can be concluded that the consequences of the COVID-19 pandemic decreased by 35% at the global level. Countries in transition and developed countries are the most

affected, given that in the first year of the pandemic, there was a decrease in FDI in these countries by 59% and 58%, respectively. The pandemic affected developing countries the least, as FDI inflows in these countries, fell by only 8%.

In the second part of this paper, an analysis of the mobility of foreign direct investment in European Union countries from 2018 to 2020. Data on FDI inflows to EU countries are shown in Table 2.

Table 2: FDI inflows in EU countries (millions of dollars)

	2018	**2019**	**2020**
Austria	5,287	968	- 17,340
Belgium	30,821	2,886	8,437
Bulgaria	1,143	1,717	2,426
Croatia	1,171	1,336	1,304
Cyprus	- 1,735	26,183	- 3,647
Czech Republic	11,010	10,108	6,293
Denmark	1,198	3,587	1,151
Estonia	1,498	3,091	3,156
Finland	- 2,171	13,612	2,575
France	38,185	33,965	17,932
Germany	62,073	54,063	35,651
Greece	3,973	5,019	3,572
Hungary	6,410	3,884	4,169
Ireland	- 16,096	81,104	33,424
Italy	37,682	18,146	- 388
Latvia	967	874	873
Lithuania	977	1,169	479
Luxembourg	- 16,757	14,792	62,145
Malta	4,024	3,784	3,917
Netherlands	87,671	48,963	- 115,300
Poland	15,996	10,853	10,080
Portugal	7,115	12,084	6,324
Romania	6,219	5,791	2,322
Slovakia	1,675	2,449	- 1,930
Slovenia	1,384	1,227	529
Spain	53,495	8,515	8,928
Sweden	4,221	10,112	26,109
EU Total	**347,437**	**380,281**	**103,190**

Source: authors, based on the UNCTAD data

Looking at the total inflow of foreign direct investments at the level of the European Union (Table 2) in 2018, it was over $ 347 billion. In the following year, FDI increased by 9% ($ 380 billion). However, in the first year of the COVID-19 pandemic, there was a drastic reduction in FDI inflows to EU countries, which was reflected in a 73% drop in these investments compared to 2019.

Some EU countries were in a situation of reduced FDI inflows even before the global crisis caused by the COVID-19 virus. At the very beginning of the analysis, comparing the inflow of FDI in 2018 compared to 2019, it is clear that more than half of the EU countries have encountered the problem of reduced FDI inflow. The COVID-19 virus has further caused reduced FDI intensity and fluctuation in EU countries. If we talk about the decline in FDI in 2020, the negative record is held by the Netherlands, followed by Austria, Cyprus, Italy, and Slovakia.

However, it is also worth noting that some EU countries attracted more FDI in 2020 compared to the year before the pandemic. Observing individually by country, the largest recipient of FDI during 2020 was Luxembourg, with over $ 62 billion (an increase of 320% compared to 2019). Sweden also had a higher inflow of FDI in 2020 with $ 26 billion (an increase of 158% compared to 2019). In addition to

these two countries, only Spain, Malta, Hungary, and Estonia can boast a small increase in FDI in the first year of the COVID-19 pandemic compared to the previous year.

Perhaps it is even more important to determine how much foreign direct investment the EU countries have managed to attract in the observed period concerning the overall fluctuation of these investments at the global level.

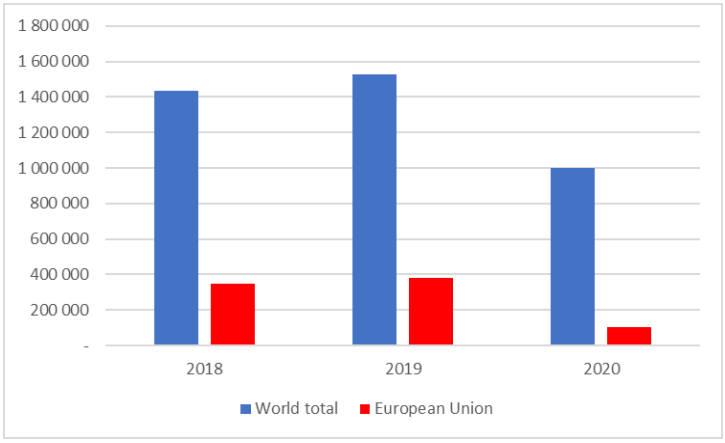


Figure 2: Total FDI inflows, 2018-2020 (millions of dollars)
Source: authors, based on the UNCTAD data

According to official UNCTAD data, comparing total FDI at the global level and FDI at EU level, the situation is as follows: (a) in 2018, EU countries attracted 24% of total world investment, (b) in 2019, EU countries attracted 25% total world investment and (c) in 2020, EU countries attracted 10% of total world investment.

Based on the above, it is more than clear that the global crisis caused by the COVID-19 virus has greatly affected FDI mobility. Most countries in the European Union are particularly noteworthy in decline in foreign direct investment. The situation is no better in other regions of the world. The trend of decreasing FDI fluctuations continued in 2021, and it is expected that in 2022 the world market will stabilize and recover from the consequences caused by the COVID-19 virus.

CONCLUSION

Foreign direct investment has a very significant impact on the economic growth and development of each national economy. On the one hand, they increase the efficiency of multinational companies, while on the other hand, they significantly help the development of that economy. If competition increases, companies will seek to invest in other countries, which automatically means that investments are based on efficiency. In contrast, the growth of FDI will significantly increase the competitiveness of companies.

In a situation when the COVID-19 pandemic has significantly slowed down the flow of free capital on the world market, foreign investors are taking special care of their investment. When the world economy is in crisis, investors usually invest capital in countries with economic growth, pursue a stable macroeconomic policy, and have a stable political situation. However, the consequence of the economic and social crisis caused by the COVID-19 virus contributed to the decline in aggregate demand, which was accompanied by a decline in investment, both domestic and foreign.

Developed countries and countries in transition most felt the lack of foreign direct investment. This situation is very unfavorable for many economies, given that FDI has been significantly represented in a large number of economies in recent years. In order to deal with the global crisis and the lack of FDI in the most efficient way, countries need to pursue a rational economic policy, ensure a good fiscal

position and create an economic environment that will allow foreign investors to invest in one of these economies. It is very important to create a support program to attract foreign investment in targeted sectors, which will be created as a response to the economic challenges facing countries, which are the result of the COVID-19 pandemic.

ACKNOWLEDGEMENTS

This paper is financed by the Ministry of Education, Science, and Technological Development of the Republic of Serbia.

REFERENCES

Fang, J., Collins, A., & Yao, S. (2021). On the global COVID-19 pandemic and China's FDI. *Journal of Asian Economics, 74*. https://doi.org/10.1016/j.asieco.2021.101300

Garcia, F., Jin, B., & Salomon, R. (2013). Does inward foreign direct investment improve the innovative performance of local firms? *Research Policy*, *42*, 231–244.

Giofre, M. (2021). COVID-19 stringency measures and foreign investment: An early assessment. *The North American Journal of Economics and Finance*, *58*. https://doi.org/10.1016/j.najef.2021.101536

Hajakawa, K., Lee, H.H., Park, C.Y. (2022). The Effect of COVID-19 on Foreign Direct Investment. *Asian Development Bank Economics Working Paper Series No. 653. https://doi.org/*10.2139/ssrn.4060417

Handoyo, R.D. (2020). Editorial: Impact of Covid-19 on Trade, FDI, Real Exchange Rate and Era of Digitalization: Brief Review Global Economy During Pandemic. *Journal of Developing Economies,* 5 (2), 84-88.

Marjanović, D., Domazet, I., & Vukmirović, I. (2022). Social Environment as a Factor of Capital Investment in Serbia. *Eastern European Economics*. https://doi.org/10.1080/00128775.2022.2048181

Marjanović, D., & Domazet, I. (2021). Tax competitiveness as a significant factor in attracting foreign investment – the case of Serbia. *Argumenta oeconomica, 2 (47),* 63-80. https://doi.org/10.15611/aoe.2021.2.04

Marjanović, D., & Domazet, I. (2021). Foreign Direct Investments: A Key Factor for Business Globalization. In *Institutional, Economic, and Social Impacts of Globalization and Liberalization,* edited by Yilmaz Bayar, 96-116. Hershey: IGI Global.

Marjanović, D., & Domazet, I. (2018). *Unapređenje makro konkurentnosti – fiskalni aspekti [Improving macro competitiveness - fiscal aspects]*. Belgrade, Serbia: Institute of Economic Sciences.

Mehar, M.A.K. (2021). Bridge financing during covid-19 pandemics: Nexus of FDI, external borrowing and fiscal policy. *Transnational Corporations Review, 13*, 109-124.

Petrovskaya, M.V., Chaplyuk, V.Z., Alam, R.M.K., Hossain, M.N. & Al Humssi, A.S. (2022), COVID-19 and Global Economic Outlook. In: Popkova, E.G. & Andronova, I.V. (Ed.) *Current Problems of the World Economy and International Trade (Research in Economic Anthropology*, *Vol. 42*), Emerald Publishing Limited, Bingley, 127-139. https://doi.org/10.1108/S0190-128120220000042013

Sharma, B. (2021). Covid-19 and recalibration of FDI regimes: convergence or divergence? *Transnational Corporations Review, 13*(1), 62-73. https://doi.org/10.1080/19186444.2021.1890433

CLIENT LOYALTY IN BANKING SECTOR

Nikola Milicevic
University of Novi Sad, Faculty of Economics in Subotica, Republic of Serbia
E-mail: nikola.milicevic@ef.uns.ac.rs
Nenad Djokic
University of Novi Sad, Faculty of Economics in Subotica, Republic of Serbia
Ines Djokic
University of Novi Sad, Faculty of Economics in Subotica, Republic of Serbia

ABSTRACT

In the last few decades, significant changes have occurred on B2C market. The increased competition, especially in the service sector, emphasized the importance of relationship marketing. Through the establishment of long-term relations, companies are trying to create and improve clients' loyalty. For this purpose, different strategies and approaches have been used, including certain technological solutions. Bearing in mind that higher levels of loyalty can be related with higher levels of revenue and profit, this theme did not bypass banking sector neither. In this paper, the attention was dedicated to clients' loyalty in banking sector. After presenting some explanations related to loyalty concept, in the second part of the paper the focus was on its models and other specifics associated to mentioned sector.

Key words: Loyalty, Banking sector, Client's needs.

INTRODUCTION

Under the influence of technological development, clients (customers) are much more informed, whereby, in some cases, they are able to analyze offers of different companies with just a few clicks. Demanding customers, on one side, and increasingly intense competition, on the other, make the struggle for market share more difficult, posing numerous challenges to companies; most of them are related to satisfying customers' needs in a more efficient way than competitors.

These issues didn't bypass the banking sector neither. As in other industries, banks are trying to establish long-term relationships with their clients. Through the development of lasting, long-term bonds, they are establishing trust, commitment and loyalty (Levy, 2014). Bearing in mind that the implementation of loyalty concept can generate larger market share and profit, in this paper the attention is dedicated to its explanation, taking into account different aspects. In addition, several models related to loyalty in banking sector are presented as well.

LOYALTY CONCEPT

In literature there are different explanations regarding loyalty. In the research of Yi and Jeon (2003), "loyalty is defined as repeated purchases of particular products or services during a certain period of time" (p. 231). Hereby, five different behavior types can be measured in order to operationalize loyalty; besides the number of purchases per customer, they include the percentage of customers who (Yi and Jeon, 2003):

- buy a brand,
- continue to buy the brand,
- are 100% loyal,
- also buy other brands.

In addition to behavioral, for measuring loyalty, two more approaches (attitudinal and composite measurements) can be applied (Bowen and Chen, 2001, pp. 213-214). As previously mentioned, behavioral approach is related to customers repurchase behavior, which represents its main indicator. The problem lies in a fact that repeat purchase doesn't always stem from psychological commitment; in the absence of a proper competitor, the reason for re-choosing a particular product or service may be its current low price or a convenient location. The second, attitudinal approach is based on measurements associated to customer's psychological and emotional attachment as a characteristic of loyalty. However, the application of this approach faces certain issues as well; in some situations, customers can have positive attitude regarding a product or a service, whereby she/he will not buy the product/service because, for example, it can be too expensive for her/him. The third, composite approach combines behavioral and attitudinal dimensions, where "loyal customers are customers who hold favorable attitudes toward the company, commit to repurchase the product/service, and recommend the product to others" (Bowen and Chen, 2001, p. 214).

Loyalty can be considered in the context of business strategy; the focus is on creating stronger, long-term relationships with customers (Duffy, 1998). Through the implementation of this strategy, customers are becoming more proactive, whereby in certain point of time some of them will even advocate the brand (Figure 1).

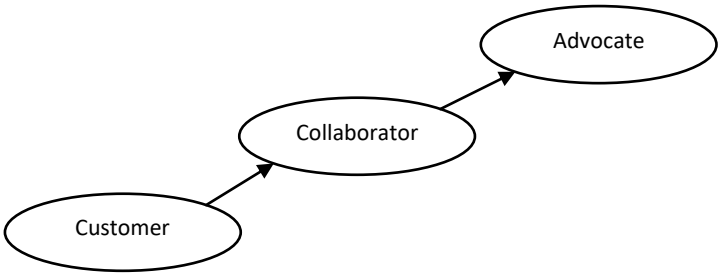


Figure 1: The loyalty hierarchy (Duffy, 1998, p. 439)

Bearing in mind its influence on company's sale and profitability, loyalty represents very important factor concerning market survival and sustainable business; due to deregulations that allowed customers more flexible approach when choosing financial services, the importance of loyalty has increased in this sector as well (Al-hawari, 2015).

LOYALTY IN BANKING SECTOR

In the last few decades significant changes have occurred in banking industry. Dynamic and competitive environment, followed by informed clients and decreasing differences in offers of financial products and services, resulted in certain business transformations; banks are changing their emphasis, turning from product-oriented to customer-oriented companies by adopting the main principles of relational marketing and focusing on customer loyalty (Beerli et al. 2004). Bearing in mind these changes and the importance of client loyalty, many researchers have investigated this concept in banking sector.

Bloemer et al. (1998) examined loyalty in retail banking taking into account perceived service quality, satisfaction and image. At the global (construct) level, their results have shown that image and service quality were indirectly related to bank loyalty via perceived quality and satisfaction, respectively. Moreover, bank loyalty was directly affected by service quality and satisfaction (Figure 2). In addition to a global level, the analysis was carried out at the level of construct dimensions, whereby position in the market, as an image dimension, and reliability, as a quality dimension, were detected as relatively important drivers of loyalty in retail banking.

Figure 2: Retail bank loyalty (Bloemer et al. 1998, p. 281)

In the research of Beerli et al. (2004), banking loyalty was investigated in relation to satisfaction and switching costs. Both variables (satisfaction and switching costs) affected loyalty, whereby the influence of the former was greater. Besides mentioned variables, proposed model included perceived quality (Figure 3). The obtained results revealed that this construct was significantly affected by satisfaction; the explanation for this direction of the relationship potentially lies in the perception of satisfaction construct as "an evaluative judgment of the value received by the customer" (Beerli et al. 2004, p. 269).

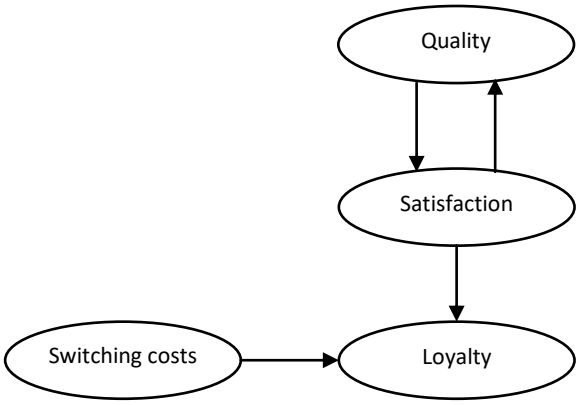


Figure 3: Model of customer loyalty (Beerli et al. 2004, p. 265)

Ladhari et al. (2011) set the model which included loyalty, recommendation, perceived service quality, image and emotional satisfaction (Figure 4). In accordance to their findings, image, perceived service quality and emotional satisfaction were considered as key drivers of recommendation and loyalty.

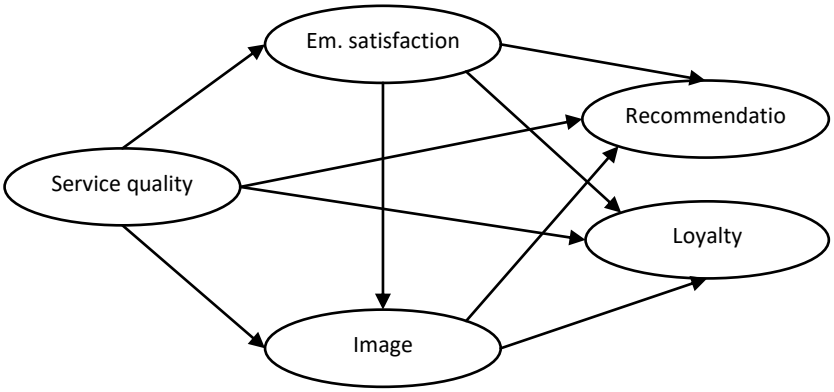


Figure 4: Loyalty and recommendation in banking industry (Ladhari et al. 2011, p. 113)

Positive relations were detected between perceived service quality, on one side, and emotional satisfaction and image, on the other, as well as between emotional satisfaction and bank image. In the research, the emphasis was also on mediating role of emotional satisfaction and image regarding the indirect effects of perceived service quality on recommendation and loyalty.

When analyzing bank trust and bank loyalty, van Esterik-Plasmeijer and van Raaij (2017) tested the model of banking system trust (Figure 5). They focused on six variables: value congruence, transparency, customer orientation, integrity, stability and competence. In addition to trust, bank loyalty was explained by four more determinants: value congruence, transparency, stability and competence.

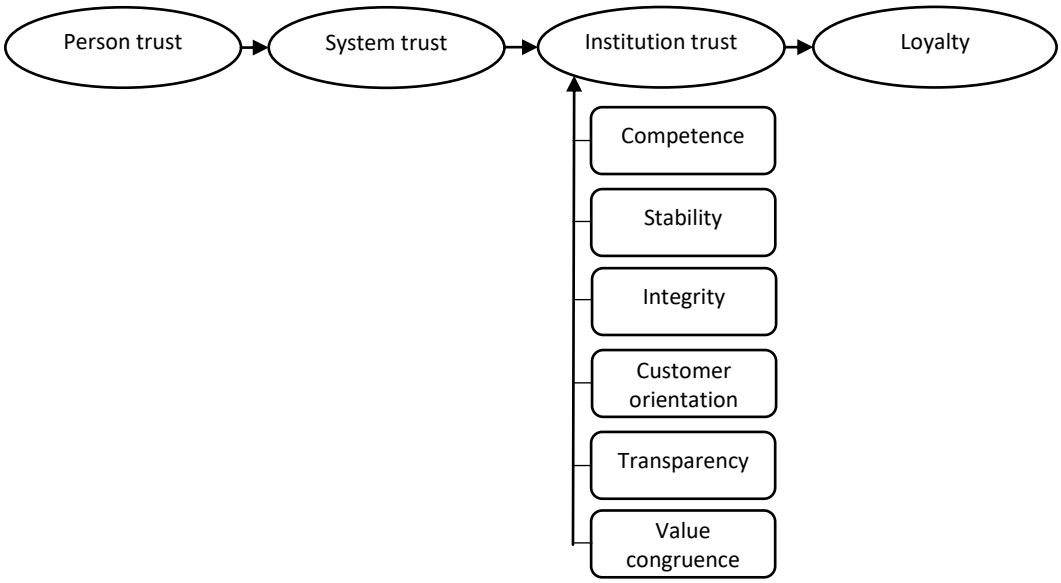


Figure 5: Bank loyalty and bank trust (van Esterik-Plasmeijer and van Raaij, 2017, p. 103)

Bank loyalty was also examined in on-line conditions. In regard to online banking services, Levy (2014) proposed a conceptual model which integrated service relative usage level, service quality satisfaction, service convenience and bank loyalty (Figure 6). Research results pointed to the existence of direct, significant and positive relationship between customer satisfaction with on-line banking service quality and bank loyalty. Direct and significant, but negative relationship was recorded between bank loyalty and service usage level. The subject of the analysis were also indirect effects on bank loyalty; while the indirect effect of service quality satisfaction on loyalty via service relative usage level was negative, the indirect effect of service convenience on bank loyalty via service quality satisfaction was positive. Besides mentioned variables, the research included bank size and some demographic characteristics.

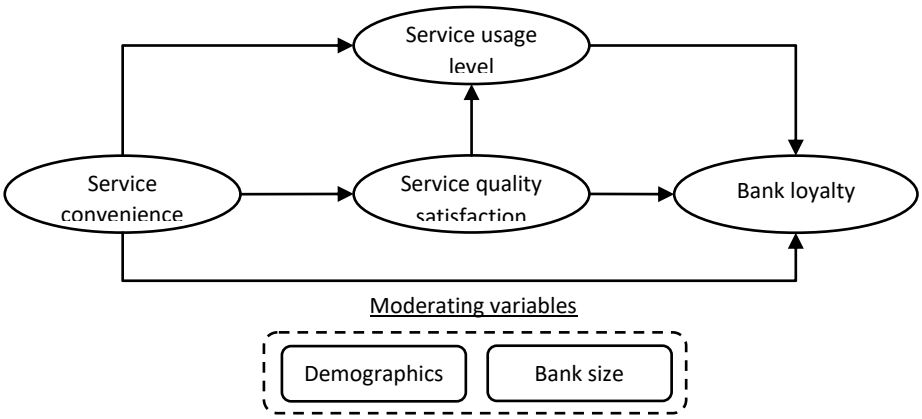


Figure 6: Bank loyalty in on-line conditions (Levy, 2014, p. 294)

When it comes to mobile banking, Esmaeili et al. (2021) designed the model in order to investigate customer loyalty. In addition to loyalty, it consisted of six more variables: perceived risk, usability, relative advantages, customer service, trust and satisfaction. Customer loyalty was significantly and positively affected by trust, satisfaction and relative advantages, and negatively by perceived risk.

CONCLUSION

Market changes reflected in more informed clients and increased competition have brought many challenges in different business sectors, including banking industry. In order to overcome these issues, various strategies and approaches have been implemented. Among them, special place belongs to loyalty concept, based on establishing long-term relationship with clients.

Loyalty can been viewed from behavioral aspect; in this regard it is usually related to repeated purchase, as a type of behavior. However, it can be observed from attitudinal and composite aspects as well. While the former is associated to client's psychological and emotional attachment, the latter represents the combination of the previous two (behavioral and attitudinal) (Bowen and Chen, 2001). Moreover, loyalty can be considered as a strategy, through which implementation, customers can even become brands advocates (Duffy, 1998).

When it comes to banking sector, different models were used for the purpose of analyzing clients' loyalty. In some of them, loyalty was examined in relation to service quality and satisfaction, as its main predictors. Variables that were also included in these analyses were image, switching costs, recommendation, trust, etc. It should be noted that in the case of on-line or mobile banking, special models can be applied.

REFERENCES

Al-hawari, M.A. (2015). How the personality of retail bank customers interferes with the relationship between service quality and loyalty. *International Journal of Bank Marketing*, *33*(1), 41-57.

Beerli, A., Martín, J.D. & Quintana, A. (2004). A model of customer loyalty in the retail banking market. European Journal of Marketing, 38(1/2), 253-275.

Bloemer, J., de Ruyter, K. & Peeters, P. (1998). Investigating drivers of bank loyalty: the complex relationship between image, service quality and satisfaction. *International Journal of Bank Marketing*, *16*(7), 276-286.

Bowen, J.T. & Chen, S. (2001). The relationship between customer loyalty and customer satisfaction. *International Journal of Contemporary Hospitality Management*, 13/5, 213-217.

Duffy, D.L. (1998). Customer loyalty strategies. *Journal of Consumer Marketing*, *15*(5), 435-448.

Esmaeili, A., Haghgoo1, I., Davidaviciene, V. & Meidute-Kavaliauskiene, I. (2021). Customer Loyalty in Mobile Banking: Evaluation of Perceived Risk, Relative Advantages, and Usability Factors. *Inzinerine Ekonomika-Engineering Economics*, *32*(1), 70-81.

Ladhari, R., Souiden, N. & Ladhari, I. (2011). Determinants of loyalty and recommendation: The role of perceived service quality, emotional satisfaction and image. *Journal of Financial Services Marketing*, *16*(2), 111-124.

Levy, S. (2014). Does usage level of online services matter to customers' bank loyalty? *Journal of Services Marketing*, 28/4, 292-299.

van Esterik-Plasmeijer, P.W.J. & van Raaij, W.F. (2017). Banking system trust, bank trust, and bank loyalty. *International Journal of Bank Marketing*, *35*(1), 97-111.

Yi, Y. & Jeon, H. (2003). Effects of Loyalty Programs on Value Perception, Program Loyalty, and Brand Loyalty. *Journal of the Academy of Marketing Science*, *31*(3), 229-240.

ANALYSIS OF THE CAPITAL MARKET OF THE REPUBLIC OF SERBIA

Miloš Pjanić
University of Novi Sad, Faculty of Economics, Subotica, Republic of Serbia
E-mail: milospjanic@ef.uns.ac.rs
Mirela Mitrašević
Univeerzitet u Istočnom Sarajevu, Fakultet poslovne ekonomije, Bijeljina, Bosnia and Herzegovina
Stevan Luković
University of Kragujevac, Faculty of Economics, Republic of Serbia

ABSTRACT

Before the global pandemic Covid 19, the Republic of Serbia stabilized its macroeconomic indicators, which had a positive growth trend even after the global pandemic, in contrast to many developed world economies. All of the above affected the decline in interest rates and borrowing costs in the domestic market, while reducing the risk premium and credit rating by international credit agencies there is a decline in interest rates in the euro on the money and capital market, which led to increased interest from foreign investors for long-term investment in government securities. However, with the onset of the global pandemic, things in all world financial markets are changing drastically, many capital markets are facing major problems in their functioning. Smaller capital markets, such as ours, have withstood the effects of the pandemic relatively well. The aim of this paper is to analyze the financial market with a special emphasis on the capital market. The first part analyzes the situation and structure of the financial system in Serbia and the second part analyzes the current situation on the capital market, pointing to current weaknesses of the capital market and opportunities for its development in the function of overall capital market development and stability of the national financial system.

Key words: Financial market, Capital market, Development, Securities.

INTRODUCTION

Due to a large number of problems that our country faced in the last decade of the twentieth century, there was a drastic weakening of the capital market and stock trading. The first shifts in stock exchange trading and at the same time the revival of the domestic capital market began after 2000, with the inclusion in the secondary trading of shares from previous privatization procedures, whereby more intensive trading on the domestic stock exchange began. At the same time, with the adoption of the Law on Privatization in 2001, which obliges all joint stock companies to be listed on the Belgrade Stock Exchange, the number of given companies is growing and a large number of foreign investors are becoming more present on the domestic market. Thanks to the growing presence of foreign investors, stock prices on the Belgrade Stock Exchange as an index of the most liquid shares of BELEX15 are achieving constant growth. Unfortunately, that growth did not last for a long time, because already in 2007, with the first signs of the global financial crisis in the USA and the stock market in Serbia, it began to record a constant decline, which eventually led to the collapse of the entire stock exchange business. All of the above forced foreign investors to sell off their portfolios and leave the domestic capital markets, which resulted in a drastic drop in stock prices and turnover on the Belgrade Stock Exchange (Rakočević, 2016).

METHODOLOGY RESEARCH

Secondary research was applied in this paper. Among the basic methods of cognition, and for theoretical considerations of the subject of research, analytical-synthetic, inductive-deductive, method

of abstraction and generalization were used. Among the scientific methods, the method of content analysis was used. Data from available professional literature, scientific and professional papers, the Internet and other sources were also used.

THE INFLUENCE OF THE FINANCIAL MARKET ON THE NATIONAL ECONOMY

In 2009, the entire world economy faced the biggest crisis since 1930, which resulted in a 1.6% drop in global gross domestic product. Developing countries, such as Serbia, are recording a decline in gross domestic product growth, with a much larger decline in developed countries, where only a few developed countries have managed to achieve economic growth. The specificity is reflected in better coping with the global economic crisis in developing countries compared to more developed countries, but there are still huge differences between developing countries (Marović & Lemić-Saramandić, 2011).

At the end of 2010, there was a gradual recovery of the entire world economy, with global gross domestic product growing by as much as 4% with a simultaneous decline in inflation. In the given circumstances, Europe is facing the problem of the public debt crisis, with a decrease in the growth of global gross domestic product in 2011, which amounted to 3%. By 2018, the global economy will grow by 3%, with a significant impact on the mentioned growth rate had a drop in inflation and interest rates.

Based on Table 1, it can be concluded that Serbia achieves variable growth rates in the observed period when it comes to real gross domestic product, with a growth of 1.78% in 2015, and the largest positive growth recorded in 2018 and amounts to 4, 30%. Due to the coronavirus pandemic, all countries faced a decline in economic growth, with our country achieving a decline in economic activity of -1.0%. Observing the inflation from the given table, it can be concluded that it is relatively stable in the observed period. In 2018, it amounts to 2%, and the price of food, oil derivatives and cigarettes primarily contributed to that. Nowadays, many countries are facing rising inflation, as is our country, with that growth going as high as 10%.

Table 1: Macroeconomic indicators in Serbia%

	2015.	2016.	2017.	2018.	2019.	2020.
Real Gross Domestic Product	1,78	3,34	2,05	4,30	4,3	-1,0
Inflation (consumer prices)	1,5	1,6	3,0	2,0	1,6	1,6

Source: (National Bank of Serbia, 2020)

The most important part of the financial system is the financial market. The development of the financial market as well as its adequate functioning affects the overall economic development of each country. When the financial market is adequately functioning, then the entire economic system is ready for rapid adjustments that require any development (Kumalić, 2013).

A developed financial market significantly affects the entire national economy. Entities that exist within less developed or underdeveloped capital markets, face problems of competitive position because they have a difficult way to raise capital under financially unfavorable conditions. This means that these entities generally have to obtain the necessary funds through bank loans because they do not have the ability to issue debt securities. All of the above creates high borrowing costs because interest rates on bank loans are higher than bond interest rates. In order for a financial market to be developed, an adequate state strategy with precisely defined incentive measures is needed. Serbia's economy has been facing the problem of illiquidity for years, with the financial market and especially the capital market not developed enough to reduce the problem (Ivanišević, 2018).

Table 2: Structure of the financial market in Serbia

	2015.	2016.	2017.	2018.	2019.	2020.
Banks	30	31	29	27	26	26
Insurance companies	24	23	21	20	20	20
Leasing	16	16	16	17	17	16
Voluntary pension funds	7	7	7	7	7	7

Source:(National Bank of Serbia, 2020)

A key feature of the national financial market is over-dependence on banks, dominated by foreign banks, with the national economy paying off loans that are among the most expensive in Europe (Đulić & Živković, 2012). Table 2 shows the bank-centric nature of the national financial market, where it can be seen that the number of banks in 2015 was 30 and in the following year 31, so that the number decreased in the last period and in 2020 there are 26 banks in our financial market. In the last two years, the takeover, merger and acquisition of individual banks has been noticeable. In the observed period, the number of insurance companies in the domestic financial market remained the same and we have 20 insurance companies, and the number of leasing companies in the observed period was almost unchanged. The number of voluntary pension funds in the observed period was unchanged and amounted to 7 voluntary pension funds.

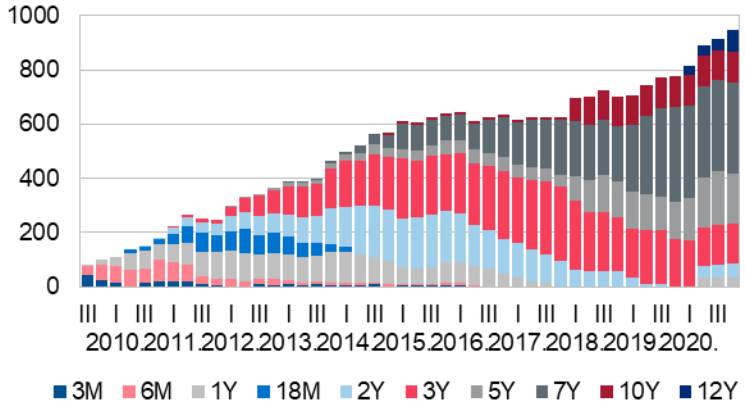
SITUATION AND POSSIBILITIES OF CAPITAL MARKET DEVELOPMENT IN SERBIA

The development of the capital market is a great challenge for our country, and a number of measures must be taken into account, such as: changing the ownership structure of the economy, strengthening the national economy, establishing macroeconomic stability, establishing and maintaining social peace (Simić, 2011). After numerous problems in the 1990s and the practical non-existence of the capital market, a significant impetus to the development of the capital market in Serbia was provided by the adoption of the Law on Investment Funds, Voluntary Pension Funds, Securities and Other Financial Instruments and the 2006 takeover. At the very beginning of their business and by passing the mentioned laws, numerous institutions achieve enviable results and influence the development of the capital market.

The Belgrade Stock Exchange is recording a record market capitalization with an increasing number of foreign investors. However, the success of the domestic capital market was short-lived, because only after two years of successful business on the domestic market, the global economic crisis of 2009 occurred, which spilled over from the United States to other European markets. The crisis has seriously shaken business in both developed and developing countries such as Serbia. There is a significant decline in trading on the Belgrade Stock Exchange, a decline in market capitalization, a reduction in the listing of a large number of shares, as well as the abandonment of foreign investors in the domestic financial market. After several years of weak business, there is a slight recovery of the capital market, but still underdeveloped. All of the above has led to an increase in uncertainty as well as investment risk (Radović & Vračarić, 2012).

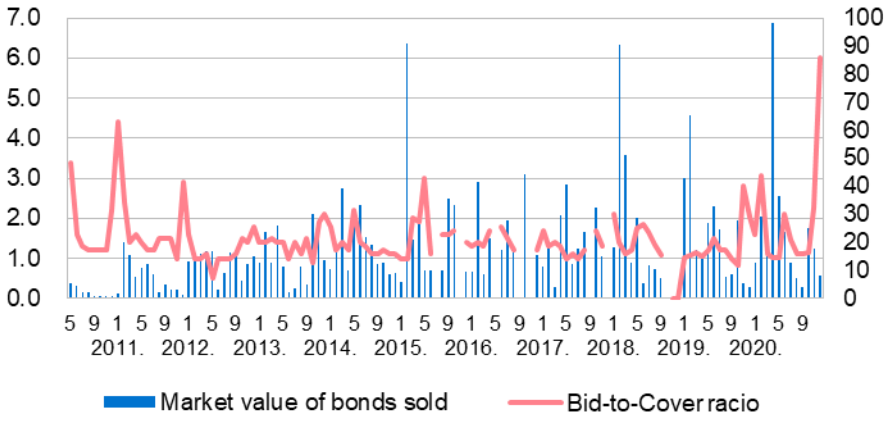
The most important segment of the national financial market is the government bond market. By selling them on the domestic financial market, the state obtains the necessary funds on relatively favorable terms. This contributes to the increase in the dinarization of the domestic financial system and the reduction of the state's exposure to currency risk. Due to the improved macroeconomic and fiscal situation in the country, government indebtedness was reduced with fewer auctions, lower amounts of securities offered for sale and favorable interest rates, with most government bond issues related to longer-term dinar securities. At the end of 2020, 912.6 billion dinars of dinar government bonds with a maturity of more than one year were sold, which is 17.9% more than at the end of the previous year. Seven-year bonds had the largest share of 36.9%, while the share of three-year government bonds increased from 17.8% to 20.5% (National Bank of Serbia).

The reduced need of the state for borrowing made it possible to accept only those offers with sufficiently low interest rates. The bid-to-cover ratio, which indicates the ratio of the requested and accepted amount of government dinar bonds, indicates a relatively favorable situation at primary sales auctions. However, at the beginning of 2021, due to the situation caused by the coronavirus, all countries were forced to take on additional debt, including Serbia (National Bank of Serbia).



Graph 1: Balance of dinar government securities in billion RSD
Source: (National Bank of Serbia, 2020)

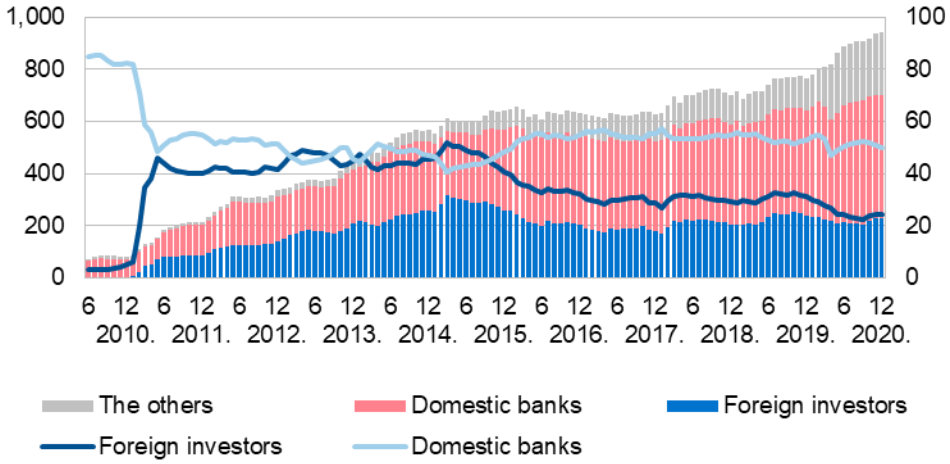
During 2018, the share of foreign investors in the dinar government bond portfolio increased slightly, from 28.6% in 2017 to 29.2% in 2018. Since the end of 2015, domestic banks have been the predominant owners of government bonds, and their share in the dinar securities portfolio during 2018 decreased by about 0.7%. and amounted to 54.7%. Other investors are still significantly less represented in the ownership of sold dinar government bonds, but in recent years it has been noticeable that their share is increasing. Continuing to expand and strengthen the base of domestic institutional investors will be of great importance in the coming period to improve the government bond market, as well as to reduce the sensitivity of this part of the market to developments in the international environment (National Bank of Serbia).



Graph 2. Demand for dinar government bonds in billion RSD
Source: National Bank of Serbia, 2020

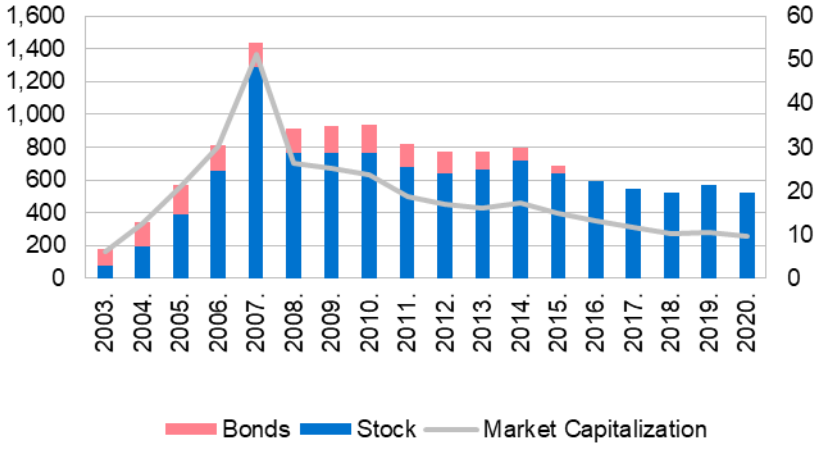
The turnover on the secondary market of dinar government securities in 2020 was lower than in 2019, when it amounted to 416.6 billion dinars. Secondary trading in securities denominated in euros amounted to 664.7 million euros, and in 2019 to 672.2 million euros. At the end of 2015, long-term government bonds were included in the Prime Listing of the Belgrade Stock Exchange, and the total turnover of these bonds (denominated in dinars and euros on the Belgrade Stock Exchange in 2020 amounted to 43.7 billion dinars (National Bank of Serbia).

Now individual investors have easier access to trade in government bonds on the Belgrade Stock Exchange, and thanks to that, trading in government bonds on the secondary market, affects greater liquidity and transparency of the secondary market. At the same time, it is important to note that the introduction of benchmark bond issues had a positive impact on the volume and continuity of secondary trading. As in many foreign developed countries, the development of government securities markets can be expected to be influenced by the use of financial derivatives and the introduction of the function of primary dealers, which should contribute to the improvement of the primary and secondary government securities market. (National Bank of Serbia).



Graph 3: The structure of the portfolio of dinar state hats of value
Source: National Bank of Serbia, 2020

The total market capitalization of the Belgrade Stock Exchange at the end of 2020 amounted to 523.4 billion dinars, which is about 9.6% of GDP. Compared to the previous year, it decreased in all market segments. On the part of the listing for 25.1 billion dinars, and on the MTP115 segment for 10.6 billion dinars, and on the Open market segment for 10.5 billion dinars.



Graph 5: Market capitalization of the Belgrade Stock Exchange in billion RSD, (in% of GDP)
Source: National Bank of Serbia, 2020

On the Belgrade Stock Exchange, the total turnover of shares in 2020 amounted to 5.0 billion dinars, which is 35.7 million dinars less than the previous year. Shares traded on the MTP and Open Market segment of the Belgrade Stock Exchange at 1.4 billion dinars.

In order to improve the domestic capital market, it is necessary to encourage domestic companies to finance their growth and development by raising capital through initial public offerings of shares. The state intends to sell all public companies and for those companies to appear on the stock exchange. By going public, it would list its shares and sell its shares, thus providing the necessary financial resources for further growth and development. The state should, through certain regulations, try to prohibit all owners of state-owned enterprises acquired through privatization from leaving the shareholder form of organizing companies and enterprises (Šalić, 2018).

CONCLUSION

In the financial market of Serbia, there is still a large structural imbalance between banks and other institutions such as insurance companies, voluntary pension funds, leasing companies, investment funds and capital markets. The bank-centric nature of the financial system, the structural imbalance between the mentioned institutions and the underdeveloped capital market is the current situation in the national economy. For achieving economic growth, for state policy makers, the capital market is one of the most important segments of the national economy. Faced with the consequences of the global economic crisis and the Covid 19 crisis, many economies are unable to meet all the growing needs for capital. At the same time, as a necessity of their survival and then growth and development, there is a need for private investments through the capital market, ie the stock market.

Regardless of the existence of the necessary institutions, as well as the adoption of a number of laws and regulations, the transition of the capital market in Serbia is still not over. One of the key problems is great distrust in the domestic capital market, and this problem is very difficult to solve because subjective feeling is more present than rational thinking. Huge quality and constant efforts are needed to establish trust in order for the national capital market to become competitive in the global market. In addition to all the above, it is necessary to establish more regulations in this area, because all of the above would affect the inclusion and listing of a large number of shares of large companies on the Belgrade Stock Exchange, which would result in increased turnover and overall market capitalization.

REFERENCES

Đulić, K., & Živković, B. (2012). Tržište korporativnih obveznica u Srbiji. *Kvartalni monitor 30*, 72-85.

Ivanišević, N. (2018). Postkrizna situacija na finansijskim tržištima u Srbiji i okruženju. *Ekonomija teorija i praksa 11(2)*, 51-63.

Kumalić, I. (2013). Razvijenost finansijskog tržišta u Bosni i Hercegovini. *Časopis za ekonomiju i tržišne komunikacije 1*, 57-72.

Marović, B., & Lemić-Saramandić, M. (2011). Osiguranje kao determinanta održivog razvoja društva. *Ekonomika preduzeća 59(1-2)*, 65-72.

National Bank of Serbia. (2020). *Годишњи извештај о стабилности финансијског система*. Београд: Народна банка Србије.

Radović, M., & Vračarić, V. (2012). Primena beta koeficijenta na tržištu kapitala u Srbiji. *CIVITAS 4*, 127-143.

Rakočević, R. (2016). Uticaj stranih investitora na Srpsko tržište akcija. *Bankarstvo 45(3)*, 14-35.

Simić, A. (2011). Uticaj listiranja velikih javnih kompanija na nivo likvidnosti tržišta kacija u Republici Srbiji. *Škola biznisa 3*, 176-186.

Šalić, R. (2018). Continuous fall of Belgrade stock exchange as a result of lack of quality companies in Serbia. *FBIM Transactions 6(1)*, 130-143.

APPLICATION OF THE INFORMATION TECHNOLOGY IN MITIGATION OF THE PANDEMIC CRISIS CONSEQUENCES IN THE DOMESTIC ECONOMY

Jelena Slavić
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia
E-mail: slavic.jelena97@gmail.com
Jelena Vukajlović
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia

ABSTRACT

Nowadays, in current market conditions, it is essential for the attention to be focused on any business step or a major decision that can affect the future operations of an organization. Introduction of the technology solutions in business, in a higher percentage, could be of great importance for the Serbian economy. Many companies that enjoyed a "secured" position on the market scene, due to the pandemic of the Covid-19 virus, which lasted from December 2019 until today, were forced to adjust their business volume by reducing it or completely shutting their company down. This paper will explore the extent to which domestic companies are ready to withstand the turbulence of the forthcoming economic crisis as well as how to thrive in conquering new markets in such harsh conditions.

Key words: Covid-19, economy, change, information technology, Serbia.

INTRODUCTION

In today's world, we are witnessing frequent changes, which are an indispensable part of every economic area. Managing the changes drastically reduces the risk of failure and increases the chances of a return on investment.

Scientific and technological progress, competition, international relations, market conditions and globalization, cause constant changes that force companies to adapt themselves to changing conditions accompanied by new challenges, to harmonize their development and business strategies, and then the organizational structure, staff, skills and knowledge to survive in an environment that is subject to change. (Vasić, 2005).

THE NEED FOR A CHANGE IN THE WAY OF DOING BUSINESS

Managing changes and making the right decisions is much easier when there is a steady path ahead for a manager. Then it is even possible to predict a change, which opens the possibility for managers to avoid certain problems or to solve them much easier because then the change is an event that had been planned and already prepared for. The changes in the organization, regardless of the level at which they are implemented, require that every part of the organization is involved in them, and most often include changes in technology, production procedures, organizational structure, as well as the changes in the structure of employees in the company. (Sajfert, 2008).

The transition in which our country finds itself, combined with the problems arising from the environment and within our society and economy, has led to a significant economic crisis. Getting out of the economic crisis means introducing deep and substantial changes at the level of the economy as well as at the level of organizations.

Considering what is changing in the organization, it is possible to talk about four types of changes within the organization: (Sajfert, 2008).

- ” technological changes,
- changes in products and services,
- structural and systemic changes,
- changes in the structure of employees.”

Necessary changes that need to be implemented include all the areas of a business organization functioning, starting from increasing labor productivity, responsible spending, cost reduction, then efficient investment management, including training of employees and managers to acquire new knowledge and skills. The most significant changes should take place in the field of production and service provision, where it is necessary to apply the organization's restructuring process, which should be followed by investments in the organization's development. In our companies, the process of reorganization is the most common, which implies the transformation of the organizational model, which can have an effect only if it is combined with the process of company program restructuring. (Bogdanović, 2013).

It is expected that the crisis caused by Covid-19 will affect the Serbian economy primarily through the processing industries in the field of export, and the production of durable goods. Producers, who are exporters, employ by far the largest number of workers of all the sectors that could be affected by the crisis. A negative may occur as demand for exports falls and logistics (e.g. raw material import) become more complex. In addition, the demand for durable goods often declines sharply in crisis.

One of the conclusions of the research conducted by the Serbian Association of Employers, with the technical support of the International Labor Organization (ILO) and in partnership with the European Bank for Reconstruction and Development, was that the results of more than 50 percent of companies, operating in the Republic of Serbia, stated that during the Covid-19 virus pandemic, they had negative consequences for their finances and business in general, while small and micro-enterprises were the most affected ones. The research was conducted in the period from April 7 to April 30 in 2020, and it included a sample of 400 companies in the territory of the Republic of Serbia. The goal was to assess the extent of the negative business impact caused by the Covid-19 pandemic. Further, the research showed that 30 to 40 percent of the surveyed companies experienced the liquidity issue. Falling turnover and demand, the problems with the delivery of goods and suppliers, and the absence of sick employees are just some of the difficulties that Serbian businessmen still face. The catering sector has suffered by far the largest loss. In that sector, the work regime was adjusted according to the number of infected people, and at some time intervals, they were even completely forbidden to work. Of the total number of survey participants, 91% of catering companies did not lay off their employees, although more than 94% of surveyed businessmen had obvious problems with their finances, while also many businessmen were left completely without income. Many industries and sectors had the opportunity to operate smoothly or adapt to situations through remote working, startups companies, transition to online business, etc. but the Covid-19 pandemic prevented the catering sector from any kind of business, which was evident through numerous consequences such as financial difficulties and closing the premises. The catering facilities closure has also negatively affected some other companies, such as those that supply beverages and basic supplies.

In the first days of the epidemic, it was noticed that companies are extremely capable of reacting quickly, being flexible, and adapting their work to the conditions of the state of emergency to run their business smoothly. According to the survey of the Serbian Association of Employers, more than 80 percent of businessmen have managed to adapt to the situation and continue to do their business, both from business premises and through distance work. (RTV, 2020).

In today's modern world and society, there are certainly differences and inequalities, so there are different perspectives for development, which are very great. Therefore, the attitudes of the developed countries, moderately developed or completely underdeveloped ones should be separately discussed. Serbia is, in economic terms, a small country, and to achieve economic growth, its companies must

internationalize their business and turn themselves more to the foreign market. For now, the results that Serbian business entities have achieved through the export activity, during the last few years, cannot be considered satisfactory. (Vesić, 2010).

Considering that Serbia is a small country in the economic sense, the only way to achieve economic growth is for its companies to internationalize their business activities and start, to a greater extent, operating in foreign markets. For now, the results achieved by Serbian economic entities through an export activity during the last few years cannot be considered satisfactory.

The development of information technologies has led to the emergence of new occupations and increased knowledge among people. Many people were forced to learn to work with computers during the pandemic, to use programs to run their businesses, mostly working from home. It can be said that information technologies, under the influence of Covid-19, have an impact on management and knowledge, but also contribute to improving the development of employees at a much higher level than before. To survive, companies must follow trends, be innovative and invest in information technology, as well as in technology in general, if they want to ensure survival and even better positioning in the market.

ANALYSIS OF THE USE OF INFORMATION TECHNOLOGY FOR BUSINESS IMPROVEMENT

Based on the research in 2020, conducted by Melluso Nicola and his colleagues from various departments, some of whom are from the University of Information Technology and the University of Industrial Engineering, we can observe and confirm the significant impact of information technology during the Covid- 19. The research was conducted thoroughly, with 453 articles related to both Covid-19 and information technology. The focus was on the impact that digital technology and Covid-19 have on the industry, the market, and the whole society. It was stated that due to the social distance, the industries had to change and reorganize their production to survive and maintain the state that was before the Covid-19 virus appeared. That change is a transformation that includes machines with advanced technology, robots, Vi technology, and IoT devices. The low-cost access, based on IoT devices and IT platforms (mostly small Manufacturing Execution Systems) is an affordable alternative to digital transformation. (Melluso et al, 2020).

The crisis has caused the technology community to undergo serious adjustments due to many constraints. However, the results of the research show that the modern technological environment provides solutions quickly and efficiently thanks to information technology. Flexibility has also been proven in the community of the startup companies and other industries. (Melluso et al., 2020).

In our country, the most significant problems are related to market, program, technological, organizational, managerial, and some other changes and institutional transformations. The further development of our economy depends on the degree of their success.

Without appropriate software, market, and technological transformations, our institutions remain in their current state, often with outdated and unattractive production programs and inefficient technology, which gives expensive and uncompetitive products. Organizational restructuring of companies is a very complex and difficult process to implement and carries many problems at each stage of its implementation.

The factors that can disrupt the adaptation, whether it is about the organization and its subsystems or the environment, are the cause of the organizational changes. These organizational changes can be external, which means that they come from outside the environment or the internal ones that come from the inside of the organization.

The external factors, the ones that come from the outside of the organization, are the factors that consist of the technological, political, or economic environment. The development of technology and its progress is one of the key external factors. The changes brought by new technologies in the epidemic are extremely important for the survival of the companies in the market and the achievement of their competitive advantage. Unlike the external ones, **the internal** factors experience changes and system disruptions within the companies.

Product diversification is considered one of the most productive strategies for change, i.e. to focus companies on more promising markets to reduce certain risks, develop new products, or pay more attention to research and development. This strategy also allows companies to grow and increase their revenue. The management changes are important and effective if the managers themselves could look at business differently if they have the creativity to develop new and quality ideas. (Pavlović, 2003).

Many companies have increased their financial productivity by reducing and rebuilding their workforce. Serbia, as a smaller country without any problems, certainly has enough space to realize its growth in the current globalization in many ways, in which foreign investments and poor use of concessions such as the use of public goods, performance of work and service activities are most noticeable.

In 2012, Serbia was in the 160th place based on the foreign investments at its disposal, while the share of foreign investments was 27.4% a year before. In 2011, Serbia was one of the countries that were highly dependent on foreign direct investment. Of all the countries in the Balkans, Montenegro was the only one with a higher percentage of investments and thus was in 12th place. (Vesić, 2010).

Due to the difficult conditions caused by the Covid-19 pandemic, many educational institutions have switched to an online system. They had to adapt to the current conditions and enable uninterrupted teaching and further dissemination of knowledge to their students.

According to a survey of 14,715 respondents conducted by the Serbian Institute for the Improvement of Education in 2020, the contribution and positive impact of information technology are confirmed, although previously in Serbia this way of teaching was not applied at a significant level. More than 50% of the respondents answered that after the pandemic, they will even combine online and traditional in-person classes. Distance learning has provided teachers with free resources and tools and online training all thanks to information technology. Research has shown that more than 50% of respondents are satisfied and pleasantly surprised with the wide range of available software tools, resources, and materials provided by information technology.

The organization of the educational program as well as the distance learning in Serbia, in the extreme conditions of the Covid-19 pandemic, confirmed the great importance of this type of education and the application of modern technologies in the teaching process implementation. (Stojanović, 2020).

STEPS TO MITIGATE THE CONSEQUENCES OF THE PANDEMIC ON THE DOMESTIC ECONOMY

The entire planet has been forced to face the Covid-19 pandemic and adapt to new business conditions. Unfortunately, many companies, affected by the crisis, had to shut their business down, since they failed to harmonize their business with the arrival of rapid changes in the market conditions, where, at that time, there was room only for the strongest ones. To secure a place in the market, which, more than ever before, requires rapid adoption of changes, and then adaptation to them, (Sood, 2020), it is stated that the next seven steps would provide the insight into what problems companies should prevent, as well as in which direction changes in business should take place, to improve efficiency, maintain control over the company's finances, but also ensure a market position in such challenging times.

1. Health and safety issues
- "Are the best protection measures applied to protect employees?"
- Are employees able to switch partially or completely to distance work?
- Does the company have an emergency plan for the quarantined employees?
- Is the paperwork process speeding up to reduce the financial troubles of laid-off employees?"

2. Preparation of the communication plan
"The communication plan should target *employees, customers, i.e. consumers and suppliers*." It is crucial to create a clear and concise message, and then conduct regular updates and optimize the available technologies for sending them.

3. Reaching out to customers
If a change in the way of doing business is reduced to business in the short term, it will result in an appropriate effect on profit and the business itself.

4. Addressing suppliers
Supply chains are limited and if a supplier that cooperates with the company is abroad or relies exclusively on imports, there is a risk that the product will not be present on the market in sufficient quantities at all and thus the company might be put in an unenviable position in the eyes of the customers.

5. Assessment of available capacity and resources

6. Building a weekly cash flow forecast

7. Preparing for recovery
The cash flow forecast is the key segment in the recovery phase. When things start to turn around, the company will be forced to spend money, that is, to invest first, to get back what it had been invested, and thus to make money. During the recovery, the company will have to consider the following steps in advance:
- "confirm and finalize orders,
- make the procurement plan of materials,
- plan an employee recall,
- receive new shipments,
- do the operationalization." (Sood, 2020).

CONCLUSION

In the current conditions, it can be concluded that the positive dimensions of globalization are less visible, unlike the negative ones. This is especially evident in terms of widening the gap between developed and underdeveloped countries, which leads to the creation of a "global risk society." In such circumstances, many countries, which need the benefits of globalization, are in danger of being completely marginalized.

The need for changes in domestic companies should not be elaborated on in more detail. Ownership and organizational changes, above all, are necessary for the survival of domestic organizations because of the strong competition appearance in times of crisis. However, despite the clear and well-known fact that deep strategic changes are needed, resistance will be present to a large extent. That is why large forces must be engaged in recruiting employees for their participation in the implementation of changes. Otherwise, the outcome of the market game is easily predictable: survival will be more than uncertain.

REFERENCES

Bogdanović D. (2013), Change Management, University of Belgrade, Bor: Faculty of Engineering.

Melluso N., Fareru S., Fantoni G., Bonaccorsi A., Chiarello F., Manfredi P., Coli E., Giordano V.,Manafi Sh. (2020). Lights and shadows of COVID-19, Technology and Industry 4.0, A preprint

Pavlović, M. (2003). Analysis of radical organizational changes, scientific paper,Belgrade: Institute of Economics, Industrija 3-4.

RTV (2020). The crown crisis hit small businesses hardest, Novi Sad:An internet article. available 25.03.2022.https://rtv.rs/sr_lat/ekonomija/aktuelno/korona-kriza-najvise-pogodila-mala-preduzeca_1138540.html

Sajfert, Z. (2008). Change management, Zrenjanin: Technical Faculty "Mihajlo Pupin".

Sood, A. (2020). COVID-19: 7 steps to sustain your business through the disruption, BDC online blog. Canada: Business Development Bank of Canada. Available 05.04.2022 https://www.bdc.ca/en/articles-tools/blog/covid-19-steps-to-sustain-your-business-through-disruption

Stojanović D. (2020). Analysis of the distant learning realization in Serbia during the Covid-19 pandemic, Institute of Economic Sciences, p.121-140.

Vasić, Ž. (2005). Management system for the realization of investment projects in the function of change management in the power industry, Ph.D. dissertation, Zrenjanin: Technical faculty “Mihajlo Pupin”.

Vesić, D. (2010). The impact of business globalization on the economic system of Serbia, Original scientific paper, Professional Journal: "International Problems", vol. 62, p.136-134.

TRANSFORMATIONS OF SOCIETY AND REVOLUTIONS IN INDUSTRY - A REVIEW OF THE REPUBLIC OF SERBIA

Dijana Tadić
University of Novi Sad, Technical Faculty "Mihajlo Pupin", Zrenjanin, Serbia
E-mail: dijana.tadic@tfzr.rs

ABSTRACT

In retrospect, the human order had five phases of transformation, forming societies according to its consciousness and knowledge. Starting from the Primitive to the Super-smart society, humanity is characterized by changes, whose common root is to do something easier and more efficiently. These changes resulted in industrial revolutions, which marked the way the economy functioned and people's lives globally. Today, we are witnessing the Fifth Industrial Revolution and the formation of Society 5.0. Countries around the world are striving to establish a new order and make the most of available knowledge. This paper looks at Serbia and deals with its progress in the industrial sphere, as well as the challenges it faces. The knowledge that is the product of various scientific researches, enables the knowledge of what stage of development Serbia is in, as well as the illumination of the path that is desirable to follow.

Key words: Society, Industrial revolutions, Development, Progress, Change.

INTRODUCTION

The implementation of the benefits of an industrial revolution is not progressing in all countries as well. The same is the case with the formation of a society. In this paper, a review of previous industrial revolutions and implications of current ones is presented. It also summarizes the knowledge about the development of societies, which were formed years ago. In addition to presenting general knowledge, the main goal of the paper is to research the literature related to the Republic of Serbia in the industrial and social sense. The essence is based in the identification of its progress in the mentioned, insight into the challenges it faces and guidelines that will contribute to its further development.

SOCIETY DEVELOPMENT

Society 1.0 (Hunting Society), refers to the period when people lived in communities, engaged in hunting and fruit gathering. During this period, temporary shelters were built, in which they stayed for up to a year. The changes in the location were made due to the search for and depletion of food sources. The discovery of fire and its use in protection from other animals, in heating, lighting and cooking, is a great discovery for this period. Jobs in the communities were divided; while the women gathered fruits, vegetables and roots, the men went hunting.

Society 2.0 (Agricultural Society), refers to the period when people began to grow crops and livestock. They settled near rivers for irrigation and fishing. They made stronger shelters, because they stayed in one place longer. They formed seating communities, which contained a larger number of people. Later, they weaved and made ceramic objects. They started exchanging goods in the form of barter. Precious stones were mostly exchanged, and necklaces were made from it.

For Society 3.0 (Industrial Society), it refers to the period when factories and machines began to replace human labor. The first industry was the textile industry, which was largely based on the use of coal. This period is characterized by mass production, the emergence of money, the development of

railways and steamships. Due to the enabled transport, more frequent trips followed. People began to acquire rights during this period.

Society 4.0 (Information Society), refers to the period when technologies simplified the use of information. People are enabled to interact with each other thanks to the use of information and communication technologies. After the discovery of this technology, people are connected regardless of where they are. State governments have strengthened the technological characteristics of the information society due to the positive effects on the economy.

"Society 5.0" points to the fifth transformation of society through history (Deguchi et al., 2020; Mashur et al., 2019; Athens et al., 2021; Miwa, 2020; Supendi & Nurjanah, 2020; Twaróg & Mieczkowski, 2019; Fukuda, 2020; Hanif & Iftikhar, 2020). Society 5.0 follows the previous four phases and integrates everything discovered so far, in the service of creating the well-being of humanity. In this era, people and machines are synchronized, and together they are focused on solving social problems (Yazid, 2021).

DEVELOPMENT OF INDUSTRIAL REVOLUTIONS

The first industrial revolution lasted from 1780-1820. years. It is considered to be the most significant transformation in human history. This revolution is characterized by steam-powered machines and various forms of work organization. Since this revolution, civilization has grown from a survival-driven society to a society that develops and thrives.

The second industrial revolution lasted from 1870-1914. years. The features of this transformation are (among other things): the use of electricity, oil discovery, the creation of automatic machines, the development of land transport and aircraft flights. The third industrial revolution took place in 1970. The use of microchips and integrated electronic components led to the creation of the Information Society. Thanks to the discovery of the Internet, the upcoming changes have led to dizzying progress in all spheres.

The fourth industrial revolution began in 2001 (Soh & Connolly, 2021) and is characterized by new technologies, sensors, big data, robotics, Internet of Things, cloud accounting and augmented reality, which enabled fully automated production and personalization of products and services.

Industry 5.0 is characterized by cooperation between humans and machines (Bharati, 2021), in order to achieve greater creativity and efficiency in production processes (Nahavandi, 2019), and to meet market demand (Javaid & Haleem, 2020). This has resulted in the integration of artificial intelligence into manufacturing facilities, in order to improve human capabilities (Martynov et al., 2019). The transition from mass adaptation of Industry 4.0 to mass personalization of Industry 5.0 is now expected (Javaid & Haleem, 2020). Figure 1 shows the intertwined development of society and industrial revolutions.

INDUSTRY AND SOCIETY 5.0

From the 18th century onwards, there were industrial revolutions that, each in its own way, shaped the world. In the 21st century, production is characterized by cyber-physical systems, information and communication technologies, automation, artificial intelligence and more. Industry 5.0 is the name of the last recognized industrial revolution, which strives to solve social problems by integrating physical and virtual space (Skobelev & Borovik, 2017). This revolution is considered to be an improved version of Industry 4.0 (Longo et al., 2020).

At the end of January 2016, the Government of Japan presented the concept of Society 5.0 (Salgues, 2018; Carraz & Hrayama, 2018; Rohim & Darwanto, 2020; Fukuyama, 2018), as a vision of human existence, for the welfare of which technology works (Deguchi) et al., 2020; Önday, 2019).

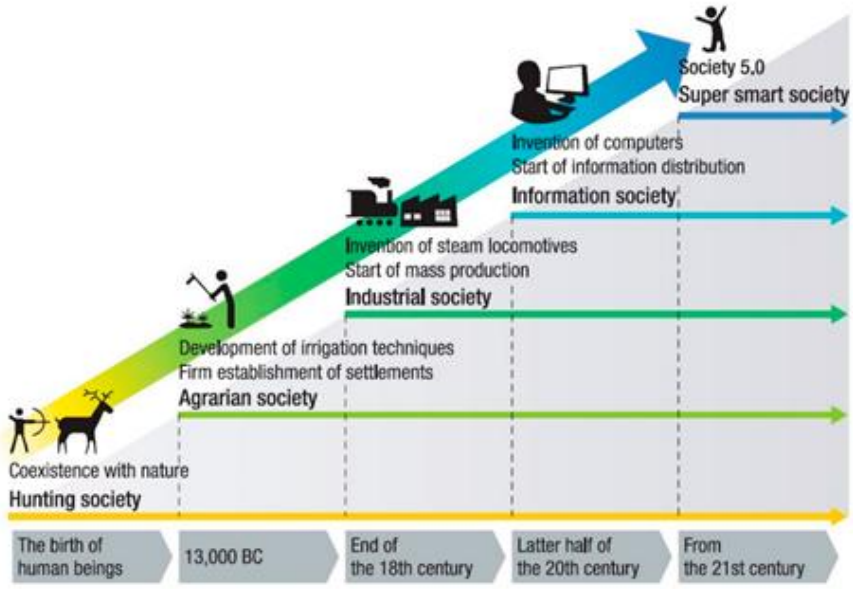


Figure 1: Development of society and industrial revolutions
(Image taken and modified from source: Fukuyama, 2018)

There is an opinion that the era of 5.0 is, in fact, the era of the Internet of Things (Aslam et al., 2020). Some authors (Özdemir & Hekim, 2018) believe that the high-tech strategy for automating the production using the Internet of Things to create smart factories, referring to Industry 4.0, has many shortcomings. They propose Industry 5.0 which, as they say, "democratizes the co-production of big data knowledge based on new concepts of symmetric innovation".

Industry 5.0 is a revolution in which man and machine reconcile and find ways to work together to improve the means and efficiency of production. Within this concept, the human-machine relationship is treated as cooperative, not competitive.

The focus of Society 5.0 is on human beings (Harayama, 2017) and their quality of life (Eze, 2021). This concept aims to offer a better living environment that exudes health, comfort and safety (Serpa & Ferreira, 2018).

According to some authors (Doyle-Kent & Kopacek, 2019), Industry 5.0 represents a “salvation for production”, expressing the belief that there may be a change in the way production develops. Accordingly, the author Nahavandi (2019) argues that the need to increase productivity without removing human resources from production poses serious challenges to the global economy, and that the concept of Industry 5.0 was introduced precisely because of the ability to respond to them. The idea of the Society 5.0 concept is to place man at the center of innovation, technological transformation and industrial automation (Pereira et al., 2020), while educating a humanistic society (Indriyani, 2021). The emphasis is not on progress, but on the use of technology for the benefit of individuals (Man, 2018; Kurniawan et al., 2019).

REVIEW TO THE REPUBLIC OF SERBIA

For the Serbian economy, the procurement of modern technology is a task of great importance. The priority of this endeavor is clear, given that the traditional industry is not arbitrarily connected with the ICT sector (information and communication technologies = ICT), and therefore does not adopt current solutions. According to one research (Matijević & Šolaja, 2018), Serbian companies invest five times less in ICT development, compared to more developed countries. Hence, in chronological order, Serbian industry cannot boast of enviable automation in the economy.

Mitrović R. (2019), said that Serbia must keep pace with technological trends and experiences of the most developed countries in the world, and this can only be achieved with the help of partnerships between the state, universities and the economy. He emphasizes that "Science, education and culture are generators of the development of society" and that only they are able to respond to the complex temptations of the modern world.

Knowledge is the main participant in modern economic development (Mitrović, 2019). A flexible education system, on-the-job training and a flexible labor market could help predict the future sector needs (Prašnikar et al., 2017), and by emphasizing digital skills in secondary schools, it would enable faster entry into the labor market.

The exchange of knowledge between state-wide education systems is considered one of the important issues that can improve education and create conditions for further development (Gao & Bernard, 2018). Schools must have the ability to prepare future employees for future work needs. Their task is to adjust the education program to technological trends that will take place in the coming period. Therefore, it can be said that it is necessary to invest in the education system, in order for it to be able to respond to the upcoming challenges. Compared to the countries of Central and Eastern Europe, Serbia invests much less in education (only 3.8% of GDP) (UNESCO UIS - Institute for Statistics, 2020).

CONCLUSION

Serbia is currently in a mix of Second, Third and Fourth Industrial Revolutions, with indications of Industry 5.0. Electricity as the basis for starting production plants, connected with information and communication technologies, with the use of cyber-physical systems, forms the basis of the Serbian economy. It is recommended to invest as much as possible in education and educational institutions, but also in advanced technologies.

Looking at the societies, it can be said that the population in Serbia is a combination of Industrial, Information, but also Super-smart society. Technological progress provides each individual with many opportunities in personal and business terms. The connection between man and industry has been reduced, and the availability of almost all information has been made possible, which enables a much greater choice of jobs and the pace of its development. Until recently, technology provided society with unimaginable possibilities, and man came to shape those same possibilities according to his will, desire and ambition.

REFERENCES

Aslam, F., Aimin, W., Li, M., & Ur Rehman, K. (2020). Innovation in the era of IoT and industry 5.0: absolute innovation management (AIM) framework. *Information*, *11*(2), 124.

Atina, V. Z., Mahmudi, A. Y., & Abdillah, H. (2021). Industry preparation in ceper klateo on Society 5.0. *International Journal of Economics, Business and Accounting Research (IJEBAR)*,*5*(2).

Bharati, S. (2021). Business intelligence and Industry 5.0. *Journal of the International Academy for Case Studies*, *27*, 1-3.

Carraz, R., & Harayama, Y. (2018). Japan's innovation systems at the crossroads: Society 5.0. *Digital Asia*, 33- 45.

Deguchi, A., Hirai, C., Matsuoka, H., Nakano, T., Oshima, K., Tai, M., & Tani, S. (2020). What is society 5.0. *Society*, *5*, 1-23.

Doyle-Kent, M., & Kopacek, P. (2019, August). Industry 5.0: Is the manufacturing industry on the cusp of a new revolution?. In *Proceedings of the International Symposium for Production Research 2019* (pp. 432-441). Springer, Cham.

Eze, O. M. (2021, January). Implication of Mass Literacy, Adult and Non-Formal Education in Achieving Society 5.0 in Nigeria. In *1st International Conference on Continuing Education and Technology (ICCOET 2021)* (pp. 69-73). Atlantis Press.

Fukuda, K. (2020). Science, technology and innovation ecosystem transformation toward society 5.0. *International Journal of Production Economics*, *220*, 107460.

Fukuyama, M. (2018). Society 5.0: Aiming for a new human-centered society. *Japan Spotlight*, *1*, 47-50.

Gao, J., & Bernard, A. (2018). An overview of knowledge sharing in new product development. *The International Journal of Advanced Manufacturing Technology*, *94*(5), 1545-1550.

Hanif, M. I., & Iftikhar, L. (2020). Post COVID-19 industrial revolution 5.0. The dawn of cobot, chipbot and curbot. *Pakistan Journal of Surgery and Medicine*, *1*(2), 122-126.

Harayama, Y. (2017). Society 5.0: Aiming for a New Human-centered Society. Collaborative Creation through Global R&D Open Innovation for Creating the Future. *Hitachi Review*, *66*(6), 8-13.

Indriyani, D. (2021, March). Urgency Value of Local Awareness Pillars of Cianjur Culture in Forming a Community 5.0. In *International Conference on Education of Suryakancana (IConnects Proceedings)*.

Javaid, M., & Haleem, A. (2020). Critical components of Industry 5.0 towards a successful adoption in the field of manufacturing. *Journal of Industrial Integration and Management*, *5*(03), 327-348.

Kurniawan, A., Komara, B. D., & Setiawan, H. C. B. (2019). Preparation and Challenges of Industry 5.0 for Small and Medium Enterprises in Indonesia. *Muhammadiyah International Journal of Economics and Business*, *2*(2), 155-160.

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.

Man, D. I. N. G. (2018). " Society 5.0": The Way of Implementation of Japan's Super Smart Society. *Contemporary Economy of Japan*.

Martynov, V. V., Shavaleeva, D. N., & Zaytseva, A. A. (2019, September). Information Technology as the Basis for Transformation into a Digital Society and Industry 5.0. In *2019 International Conference" Quality Management, Transport and Information Security, Information Technologies"(IT&QM&IS)* (pp. 539-543). IEEE.

Mashur, R., Gunawan, B. I., Fitriany, F., Ashoer, M., Hidayat, M., & Aditya, H. P. K. P. (2019). Moving from traditional to society 5.0: Case study by online transportation business. *The Journal of Distribution Science*, *17*(9), 93-102.

Matijević, M., Šolaja, M. (2018). ICT in Serbia - At a Glance, *Vojvodina ICT Cluster*, Novi Sad, Republika Srbija.

Mitrović, R. (2019). SERBIA 4.0: A Future That Must Not Be Missed. *Beograd: Zavod za udžbenike,[In Serbian]*.

Miwa, C. (2020, December). Early Childhood Care and Education Practices in Japan for the Era of Society 5.0. In *1st International Conference on Early Childhood Care Education and Parenting (ICECCEP 2019)* (pp. 27-32). Atlantis Press.

Nahavandi, S. (2019). Industry 5.0 - A human-centric solution. *Sustainability*, *11*(16), 4371.

Önday, Ö. (2019), Japan's Society 5.0: Going Beyond Industry 4.0, Business and Economics Journal, 10(2), pp.1-6.

Özdemir, V., & Hekim, N. (2018). Birth of industry 5.0: Making sense of big data with artificial intelligence, "the internet of things" and next-generation technology policy. *Omics: a journal of integrative biology*, *22*(1), 65-76.

Pereira, A. G., Lima, T. M., & Charrua-Santos, F. (2020). Industry 4.0 and Society 5.0: opportunities and threats. *International Journal of Recent Technology and Engineering*, *8*(5), 3305-3308.

Prašnikar, J., Redek, T., & Koman, M. (Eds.). (2017). *Robots among us*. Časnik Finance.

Rohim, H., & Darwanto, D. (2020, May). Pendidikan untuk menyambut masyambut masyarakat 5.0. In *Prosiding seminar nasional program pasasarjana universitas pgri palembang.*

Salgues, B. (2018). Society 5.0 and the Management of the Future. *Society 5.0: Industry of the Future, Technologies, Methods and Tools*, Wiley, pp.91-119.

Serpa, S., & Ferreira, C. (2018). Society 5.0 and social development: Contributions to a discussion. *Management and Organizational Studies*, 5, 26-31.

Skobelev, P. O., & Borovik, S. Y. (2017). On the way from Industry 4.0 to Industry 5.0: From digital manufacturing to digital society. *Industry 4.0*, *2*(6), 307-311.

Soh, C., & Connolly, D. (2021). New frontiers of profit and risk: The Fourth Industrial Revolution's impact on business and human rights. *New Political Economy*, *26*(1), 168-185.

Supendi, A., & Nurjanah, N. (2020, March). Society 5.0: Is It High-Order Thinking?. In *International Conference on Elementary Education*, 2(1), pp. 1054-1059.

The World Bank. (2020, September). UNESCO UIS: *Government expenditure on education as a percentage of GDP*. Available in: http://data.uis.unesco.org.

Twaróg, J., & Mieczkowski, P. (2019). A short story about the 5.0 community, designed to live and function in the era of 4.0 and 5G. *Warsaw: Polish Chamber of Commerce for Electronics and Telecommunications. [In Polish]*

Yazid, A. A. (2021). Existence of Islamic education in the era of society revolution 5.0. *AMCA Journal of Religion and Society*,*1*(1), 13-15.

THE IMPACT OF CONSUMER DEMAND ON FIRMS' PRODUCTIVITY

Aleksandra Zhemkova
Russian Presidential Academy of National Economy and Public Administration, Russia
E-mail: alexanikitina@yandex.ru

ABSTRACT

The paper presents the assessment of the expected market size impact on the stimulation of technological development of Russian durable goods manufacturing firms. According to the directed technological change theory, growing consumer demand is an important driver of investments in innovation and technological progress. To conduct a quantitative assessment, we use the combined micro-data on durable goods households' consumption and firms' financial results. We use TFP, labor productivity and R&D expenditures as main indicators of firms' technological progress. To exclude endogeneity of market size, we construct Engel curves for 26 durable goods and estimate potential market size for each product, independent of changes in its prices or quality. The results indicate that the effect of the expected market size is quantitatively important in all specifications: firms in sectors with growing market increase their productivity and innovation more rapidly. We also identify sectors, in which manufacturers are most sensitive to changes in the expected market size. The obtained assessments can be used to improve the demand stimulating policies, aimed at creating conditions for the modernization and intensification of innovation and production.

Key words: Demand, Market size, Firm, Productivity, Innovation.

INTRODUCTION

The ability to create and adapt advanced technologies and practices is a key source of productivity growth and technological development of countries (Acemoglu et al., 2015; Holmes et al., 2015). According to the directed technological change (DTC) theory (Acemoglu, Zilibotti, 2001; Acemoglu, 2002), growing consumer demand is an important driver of investments in innovation and technological progress. In regions or sectors with a growing market, the incentives for firms to invest in new technologies development and innovations are higher, and the process of technology adoption is faster. However, is the influence of the domestic market size still relevant in a globalized economy? To what extent will domestic demand and the expectation of its growth in the future contribute to productivity growth and technological progress of firms? If firms have a certain planning horizon, can the expectation of industry market growth stimulate innovative activity in this industry? To answer these questions, we conducted research of the expected market size impact on the creation of incentives for the technological development of firms in the Russian manufacturing sector. For this purpose, we used the example of the durable goods industries.

THEORY

According to DTC, the internal demand can be used to stimulate innovation activity: with the growth of the consumer market, the demand for simple, low-tech goods is satisfying and the demand for more technologically complex goods begins to grow. This encourages firms to increase investment in the creation of technologically more complex products, which ultimately leads to increased innovation and productivity, and, consequently, technological progress. Firms in industries with growing demand, on average, invest more in creating or adopting new technologies than those in industries where demand is stagnating. At the same time, it is assumed that economic growth changes the sectoral

structure of domestic demand: as households become richer, they spend an increasing share of their income on more high-tech, expensive durables (Fieler, 2011, Foellmi, Zweimuller, 2006). Hu, Jefferson (2008) argue that the most important driver of technological progress is the change in the structure of domestic consumption from low-tech to high-tech goods, for example, from bicycles to cars. Jaravel (2016), examining the unequal returns on various innovative products in the United States, showed that since the incomes of the wealthiest households are growing faster than the incomes of the rest of the population, firms are investing in the creation of innovative products designed specifically for this class to meet the growing demand from the wealthiest households. According to Kuznets (1973), structural changes in the economy, defined as changes in the relative spending on goods in different sectors, are one of the most important characteristics of economic growth and development.

There is a small amount of empirical literature investigating the effect of expected market size on innovation, and most of it is focused on the pharmaceutical market. This market, due to its characteristics, can provide narrowly specified data for researchers, both for market size indicators (volume of drugs sold), and innovative activity indicators (patents). Although the results of these studies are specific to the pharmaceutical industry, they indicate a high impact of expected market size on innovation activity (see, for example, Acemoglu, Linn, 2004; Finkelstein, 2004; Blume-Kohout, Sood, 2012; Dubois et al., 2015).

However, in the last years, there were articles that investigate the effect of expected market size on a broader set of industry sectors, for example, on the durable goods sector. Boppart, Weiss, 2013 assessed the impact of future market size on R&D expenditures across the US industry and showed that a 1% increase in the future market size of a particular sector would have a positive impact on R&D spending in that sector and lead to an increase in the TFP growth rate of about 0.3% over five years. Similarly, Beerli et al., 2020 investigated the impact of domestic market size on technological progress and innovation in China's durable goods sectors. They showed that the effect of the future market size can be significant, and not only for the pharmaceutical industry.

METHODS

We applied the model, presented in Beerli et al., 2020 to assess the impact of the expected market size on the technological progress of firms:

$$lnY_{i,j,t} = \alpha(lnMS^{actual}_{j,t,t+2}) + X'_{i,j,t}\beta + \eta_i + \lambda_i + \varepsilon_{i,j,t},$$

where $Y_{i,j,t}$ is the technological progress indicator of the firm i in industry j at time t; $MS^{actual}_{j,t,t+2}$ is the expected market size at the industry level, $X'_{i,j,t}$ – is the vector of a control variables (firm size, ownership structure, age, exports and Herfindahl-Hirschman index of the industry); η_i is the fixed effect of the industry, which indicates the intensity of technological progress and innovation in a particular industry, λ_i is a fixed time effect, indicating time shocks, $\varepsilon_{i,j,t}$ is an estimation error. The expected market size is defined as the sum of households' new purchases of durable goods and purchases in replacement of old goods, calculated by the depreciation rate. We consider a three-year period for a market size as it is the most likely lag between the firms' investments in innovations and their implementation.

Using the combined data from the Rosstat household survey, which contains information on durable goods consumption of households, and micro-data on enterprises from the Bureau van Dijk's Ruslana database, we conducted a quantitative assessment of the impact of the expected market size on several indicators of firms' technological progress. We focused on six sectors of durable goods production: automobiles, home appliances, electronics, home photo and video appliances, computers, and motorcycles for the period from 2015 to 2020. We considered three key indicators of the technological progress of firms: the total factor productivity (TFP) of firms, labor productivity (LP) and R&D

expenditures. TFP was calculated as the residuals of the estimated at the two-digit NACE code production function by applying Olley, Pakes (1996) procedure. LP was calculated by dividing the firm's value added by its labor costs.

We assumed that firms could build their expectations about market size in two different ways: adaptively, basing only on past market trends and dynamics but adjusting the forecast further; or rationally, using all the best available information for forecasting and making no systematic errors, in fact, accurately predicting the real size of the market.

The key hypothesis was that firms' expectations of the consumer market size for their product would drive the firm's current technological development. However, the opposite situation is more likely: technological progress can lower market prices or improve the quality of products, thereby increasing sales and the size of the future market. To exclude endogeneity, we constructed Engel curves for 26 durable goods and estimated the dynamics of the expected market size for each product. This market size indicator depended only on changes in the distribution of household income and was not affected by changes in prices or quality of goods. This new expected market size indicator meant the intensity of consumption of individual durable goods depending on income over the next three years and it was used in further research.

FINDINGS AND DISCUSSION

This section discusses the results of an empirical estimation of the proposed models. First, we provide basic results for the case of rational and adaptive expectations of firms (second-stage panel regression). Then we test the hypothesis of different impact of expected market size for exporters and non-exporters. At the end, we provide an industry analysis and investigation of the impact of the market size of individual products.

Brief results of the assessment are presented in Table 1. Estimated model included all control variables, industry, and time effects. The relationship between indicators of firms' technological progress and expected market size was quite significant. If firms form rational expectations, the expectation of a 1% growth in the size of the future market leads to an increase in firms' TFP by an average of 0.33%, an increase in labor productivity and an increase in R&D spending by 0.38%. If firms form expectations adaptively, the expectation of a 1% growth in the size of the future market leads to an increase in firms' TFP by an average of 0.31%, an increase in labor productivity by 0.3%, and an increase in R&D spending by 0.49%. These results confirm the high importance of the expected market size impact on the technological development of firms, regardless of how firms form their expectations.

Table 1: Basic results for the effect of the expected market size

	logTFP	logLP	logR&D
Rational expectations			
Expected market size	0.328*** (0.106)	0.377*** (0.085)	0.383*** (0.115)
R-sq	0.19	0.20	0.18
Adaptive expectations			
Expected market size	0.307*** (0.096)	0.301*** (0.076)	0.489** (0.213)
R-sq	0.21	0.20	0.22

The table presents the results of the second stage panel regression with random effects with standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1***.

Exporters and non-exporters

We further checked if the expected size of domestic market may have different significance for exporting and non-exporting firms. For exporters the external market may play a more important role, and the impact of the expected domestic demand may turn out to be insignificant. Table 2 presents the results of testing this hypothesis for the case of rational and adaptive expectations of firms.

Table 2: The results of market size impact on TFP for exporters and non-exporters

Переменная	Non-exporters	Exporters
Rational expectations		
logTFP	0.330***	0.307***
logLP	0.425***	0.345***
logR&D	0.478***	0.175***
Adaptive expectations		
logTFP	0.463***	0.259***
logLP	0.441**	0.287***
logR&D	0.574***	0.322**

The table presents the results of the second stage panel regression with random effects with standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1***.

The results showed that impact of the expected domestic market size is significant for both exporters and non-exporters, but it is quantitatively more important for non-exporting firms – both for the case of rational and adaptive expectations and for the most indicators. For exporting firms, the expansion of the world market is more important than the domestic one. But since a rather small share of domestic durable goods is shipped abroad, and the part that is supplied goes mostly to neighboring countries that have similar consumer demand dynamics, the estimates turned out to be quantitatively important for both groups of firms.

Sectoral results

We also identified sectors (and goods), in which manufacturers are most sensitive to changes in the expected market size. The results of estimates obtained at the industry level are summarized in Figure 1. The most sensitive to the expected market size increase was the production of automobiles (an increase in the expected market size by 1% led to an increase in the TFP of firms in this industry by an average of 0.7 – 0.9% in different specifications) and computers (0.6 - 0.8% in different specifications). The least sensitive was the production of photo and video equipment and motorcycles. Considering the dynamics of the consumer markets, the result seems quite logical: the computer and automobile markets are showing constant expansion; on the contrary, the markets for home photo and video equipment, motorcycles have already reached saturation several years ago.

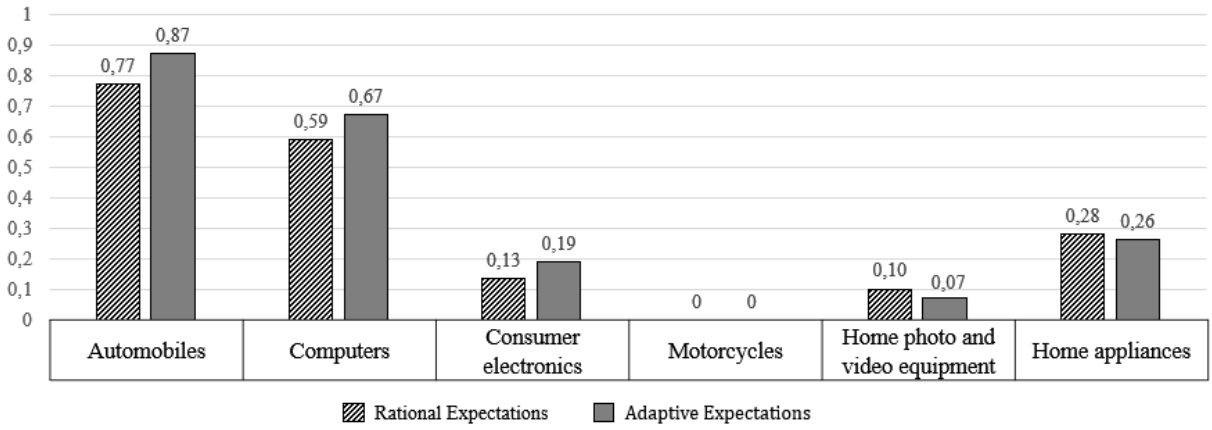


Figure 1: Sectoral results

Unfortunately, available firm statistics do not allow us to identify more narrow groups of producers of individual goods within broad industry groups. For example, the consumer electronics sector includes a wide range of products, some of which are currently showing positive dynamics of its market size, while the consumption of others, on the contrary, is declining. Most often, the same firms are manufacturers of several types of goods at once. In this regard, we assess the impact of the expected market size of each of the group's products on all consumer electronics manufacturers. We will repeat this procedure for each of the industry groups. We expect that the impact of the market size of individual products will be different.

The results are presented below. For example, computer manufacturers were more sensitive to growth in the expected size of the laptop market than desktop PCs - with an expected 1% increase in the laptop market, manufacturers' TFP grew by an average of more than 1.18%, while with an increase in the desktop PCs market – by only 0.43%. Consumer electronics manufactures were the most sensitive to the growth of expected domestic market of the smartphones (1.69% with a 1% increase in the smartphones market), e-readers (0.94%) and home theaters (0.77%). Consumer electronics manufactures were completely insensitive to changes in the expected market size of radios, stereos, and game consoles. A negative effect was revealed for the market of multimedia players (-0.195%), which is not surprising, since the consumption of this product has already reached saturation.

For manufacturers of photo and video equipment, the impact of the expected market size for cameras was 0.409%. However, a negative coefficient was obtained (-0.218%) for video cameras (the market has already reached saturation). Due to these opposite effects, the impact of the whole expected market size for photo and video equipment turned out to be insignificant. This highlights the importance of analyzing disaggregated estimates.

Appliance manufacturers turned out to be low-sensitive to the growth of the expected market size for almost all products: the largest coefficients were obtained for the market of dishwashers (0.34%), air conditioners (0.28%), freestanding ovens (0.26%) and hobs (0.29%). Manufacturers turned out to be completely insensitive to expected market size of gas stoves, dryers (perhaps there were too few of them on the market to have a noticeable impact on the manufacturers). Manufacturers also turned out to be low sensitive to changes in the expected market size of refrigerators and washing machines.

CONCLUSIONS AND IMPLICATIONS

Many studies argue that one of the most important sources of productivity growth and technological development of countries is the ability to adapt advanced technologies and practices, as well as the active investment in the adaptation and development of technologies. One of the drivers of investment in innovation and technological progress, according to the theory of directed technological change, is the expansion of the industry market size: in countries and regions with a growing size of the domestic market, the process of technology development and adaptation will be faster.

In this paper we also discuss expectations about future demand growth as an important driver for the firm's technological development. We assessed the impact of the expected market size on the indicators of technological progress of firms: TFP, labor productivity and R&D. The results showed that in average this effect is quantitatively important in all specifications, and was especially high for non-exporting firms. Regardless of how expectations are formed, firms in industries with large expected demand increase their productivity more rapidly and innovate more.

This effect could have important implications for technological progress and contribute to sustainable growth in Russian manufacturing industry in the coming years. The obtained sensitivity assessments can be used to improve the demand stimulating policies, aimed at creating conditions for the modernization and intensification of production. The calculated estimates reflect the potential response of manufacturers to the expectation of changes in future demand. Thus, if any demand stimulating policy is introduced for a particular industry or a product, manufacturers will expect an increase in

demand and, as a result, will increase investment in R&D and technological development. For different products, the response of manufacturers may differ. According to the results, the most sensitive are cars and computers manufacturers. In addition, manufacturers are most sensitive to the expectation of an increase in demand for smartphones and their components, laptops, and home cinemas. They are a little less sensitive to the expected demand growth for cameras, stationary PCs, tape recorders. Home appliance manufacturers are less sensitive to expectations of their market growth, but they are more responsive to expectations of increased consumption of dishwashers, air conditioners, freestanding ovens, and hobs. Thus, for these industries, the demand stimulation policy seems to be the most effective and can lead to the greatest growth in innovation activity and firms' productivity.

REFERENCES

Acemoglu, D. (2002). Directed technical change. *The review of economic studies*, *69*(4), 781-809.

Acemoglu, D., & Linn, J. (2004). Market size in innovation: theory and evidence from the pharmaceutical industry. *The Quarterly journal of economics*, *119*(3), 1049-1090.

Acemoglu, D., & Zilibotti, F. (2001). Productivity differences. *The Quarterly Journal of Economics*, *116*(2), 563-606

Acemoglu, D., Gancia, G., & Zilibotti, F. (2015). Offshoring and directed technical change. *American Economic Journal: Macroeconomics*, *7*(3), 84-122.

Beerli, A., Weiss, F. J., Zilibotti, F., & Zweimüller, J. (2020). Demand forces of technical change evidence from the Chinese manufacturing industry. *China Economic Review*, *60*, 101157.

Blume-Kohout, M. E., & Sood, N. (2013). Market size and innovation: Effects of Medicare Part D on pharmaceutical research and development. *Journal of public economics*, *97*, 327-336.

Boppart, T., & Weiss, F. (2013). Non-homothetic preferences and industry directed technical change. *Available at SSRN 2277547*.

Dubois, P., De Mouzon, O., Scott-Morton, F., & Seabright, P. (2015). Market size and pharmaceutical innovation. *The RAND Journal of Economics*, *46*(4), 844-871.

Fieler, A. C. (2011). Nonhomotheticity and bilateral trade: Evidence and a quantitative explanation. *Econometrica*, *79*(4), 1069-1101.

Finkelstein, A. (2004). Static and dynamic effects of health policy: Evidence from the vaccine industry. *The Quarterly Journal of Economics*, *119*(2), 527-564.

Foellmi, R., & Zweimüller, J. (2006). Income distribution and demand-induced innovations. *The Review of Economic Studies*, *73*(4), 941-960.

Holmes, T. J., McGrattan, E. R., & Prescott, E. C. (2015). Quid pro quo: Technology capital transfers for market access in China. *The Review of Economic Studies*, *82*(3), 1154-1193.

Hu, A. G., & Jefferson, G. H. (2009). A great wall of patents: What is behind China's recent patent explosion?. *Journal of Development Economics*, *90*(1), 57-68.

Jaravel, X. (2016). The unequal gains from product innovations. In *2016 Meeting Papers* (No. 437). Society for Economic Dynamics.

Kuznets, S. (1973). Modern economic growth: findings and reflections. *The American economic review*, *63*(3), 247-258.

Olley, G. S., & Pakes, A. (1996). The Dynamics of Productivity in the Telecommunications Equipment Industry. *Econometrica*, *64*(6), 1263–1297.

Session E: IT MANAGEMENT

Papers (pp. 267-278):

INTERNET OF THINGS SYSTEM DESIGN IN SMART PARKING ARCHITECTURE

Vladimir Ilin
University of Novi Sad, Faculty of Technical Sciences, Department of Traffic Engineering, Novi Sad, Serbia
E-mail:v.ilin@uns.ac.rs
Nenad Saulić
University of Novi Sad, Faculty of Technical Sciences, Department of Traffic Engineering, Novi Sad, Serbia
Dragan Simić
University of Novi Sad, Faculty of Technical Sciences, Department of Traffic Engineering, Novi Sad, Serbia

ABSTRACT

Internet of Things (IoT) is a relatively new concept in the field of computer science, electronics, and transportation. Smart parking systems encompass various domains from the field of parking information systems, including smart payment system, e-parking, and automated parking. In this paper, we have presented a IoT system design, a smart parking system design, and their integration, named IoT system design in smart parking architecture. In addition, we have explained physical layer, network layer, middleware layer, and application layer in detail and, after that, we have shown their practical application in smart parking. The proposed theoretical model aims to increase understanding of IoT paradigm in smart parking system design.

Key words: Internet of Things, Smart parking architecture, Parking information systems.

INTRODUCTION

A growing number of motorized vehicles in cities and particularly central zones of cities requires new approaches in the field of stationary traffic. There are many negative aspects of traffic jams in central zones of a city, such as driver's frustration, increased full consumption, increased noise, and negative impact on the environment (Ilin et al., 2021). The development of smart parking systems is therefore a necessity in order to reduce these negative aspects. The use of various information and communication technologies (ICT) is predominantly considered as a tool which can help in resolving the growing traffic jams in central zones of cities. In major cities available parking lots in most cases do not correspond to the increased degree of motorization.

In this paper, we consider a relatively new ICT concept, named internet of things (IoT). IoT consist of objects that become "smart" through the installation of gateways. Each object is assigned a unique identification number for authentication in the network. These enable them to communicate with other parts of the ICT system using Internet connection. IoT can be divided into several IoT functionalities including wearable devices (Smart Wearable), home automation devices (Smart Home), environmental monitoring devices (Smart Environment), corporate infrastructure support devices (Smart Enterprise), and urban infrastructure support devices (Smart City) (Perera et al., 2015). Also, IoT can monitor, manage and control equipment in real-time and, therefore, IoT provide responsive, reactive, and proactive services (Kim et al., 2017).

Smart parking is a relatively new coin, that aims to efficiently solve parking problems, particularly in cities' central zones, with the support of different ICTs. It usually means complete control of a parking system in which a driver is informed about available parking lots in real-time. Depending on the possibilities of the specific parking information system, a driver can be offered additional services, such as parking reservation and/or on-line payment. New approaches, such as dynamic pricing context

and park-and-ride context can also be offered to drivers. In this paper, we explore the implementation of IoT system design into smart parking architecture.

The rest of the paper is organized as follows. First, the IoT system design is presented and the main layers are explained. After that, smart parking systems are discussed and a smart parking architecture is elaborated. The paper concludes with the implications for researchers and future work.

INTERNET OF THINGS SYSTEM DESIGN

The IoT concept is becoming increasingly important in smart parking system design (Latif et al., 2018). Recently, different smart parking systems architectures have been proposed (Shingare et al., 2015; Saleem et al., 2022). However, most IoT-based systems consist of four layers, named physical layer, network layer, middleware layer, and application layer (Figure 1).

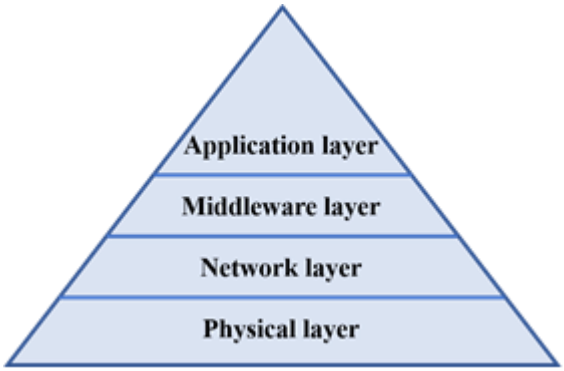


Figure 1: The basic IoT system design

The physical layer manages the physical sensors and accompanying embedded objects, that is, it deals with the collected data. Using secured communication channels, the data are sent through the network layer towards the middleware layer. The network layer includes different technologies, such as Ethernet, Wi-Fi or Bluetooth to transfer collected data to higher layers. The middleware layer encompasses different servers and databases for data collection. The application layer is used for controlling graphical user interface. It basically deals with requests from users and provides responses depending on each request.

SMART PARKING SYSTEM DESIGN

Smart parking system refers to parking management system that includes different ICT solutions, such as mobile devices, sensors, Wi-Fi connection, SQL database, cloud computing technology, and IoT. Smart parking system has evolved from traditional parking system that relied on manual tickets. An example of the smart parking system design is presented in Figure 2.

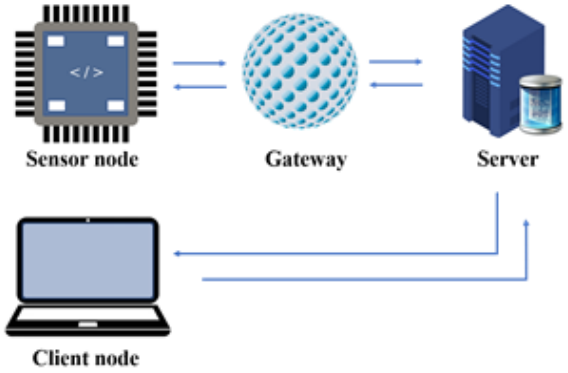


Figure 2: An example of smart parking system design
(adapted from Puspitasari et al., 2021)

The smart parking system consists of multiple sensors, gateways, servers, and client nodes. The sensor node is used for collecting data and also for information display to the user. It communicates with a server through a gateway due to different communication protocols used to exchange massages. On the other hand, the client node can directly communicate with the server. The server collects all the data from sensor node and client node and that communication is two-way.

IOT SYSTEM DESIGN IN SMART PARKING ARHITECTURE

The use of IoT system design in smart parking architecture is based on four previously explained layers: physical layer, network layer, middleware layer, and application layer. An illustration of IoT system design in smart parking architecture is shown in Figure 3.

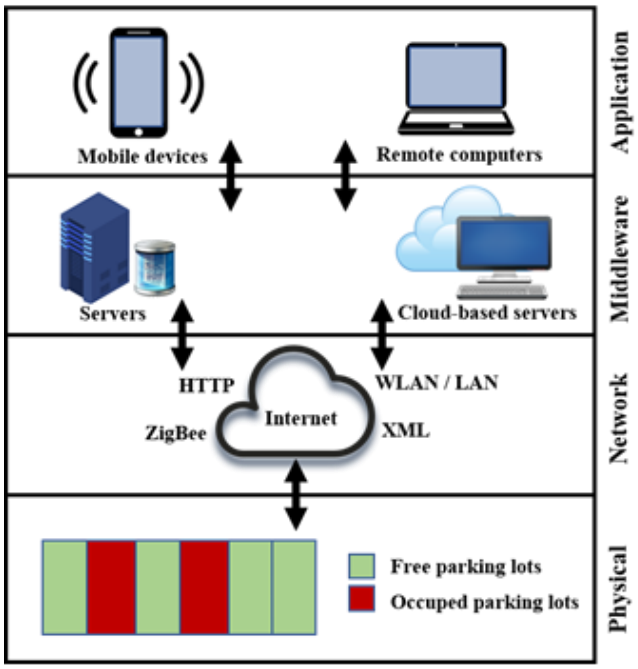


Figure 3: An illustration of IoT system design in smart parking architecture
(adapted from Biyik et al., 2021)

The physical layer consists of various sensors deployed throughout the parking system. In general, sensors include RFID, lasers, radars, lasers, and so on. The use of IoT devices equipped with different sensors has multiple purposes. First, information about free and occupied parking lots can be noted in real-time. If a parking system has several platforms, on each of them large display can be installed to show real-time information about the availability of parking lots in each section. If a parking system has only one level, then a large display can be installed on the entrance to the parking location. In addition, various additional tools can be available to drivers, such as routing mechanism throughout the parking system. This service requires the use of the specific application through a mobile phone and it is, once again, enabled by IoT devices equipped with sensors.

The network layer enables secured communication channels between the physical layer and the middleware layer. Collected data through sensors are transmitted to upper layers to be processed and after that used in the parking system. The network layer encompasses different technologies for communication, such as LAN and WLAN. All networks have specific protocols, such as ZigBee (Mainetti et al., 2016), and some even include wireless IoT protocol (Martinez-Balleste et al., 2013). These technologies are used by the IoT devices equipped with sensors and service providers, but also by users in the parking system.
The middleware layer includes different servers, including web servers, and different cloud-based services. The data are transmitted through the network layer and stored on secured locations. New

technologies, such as Blockchain, offer highest degree of data protection. Based on data stored on mentioned platforms, various applications can be developed and offered to users.

The application layer is the top layer of the proposed IoT system design in smart parking architecture. It enables participants to interact with the parking system through mobile devices and remote computers using web application. Different services can be offered to users, such as parking reservation, online payment, and so on.

EXAMPLES FROM PRACTICE

A general data protection regulation (GDPR)-compliant IoT recommender (IoTRec) system is developed within the framework of H2020 EU-KR WISE-IoT (Worldwide Interoperability for Semantic IoT) project (Saleem et al., 2022). The proposed IoTRec system has four various domains. First, it helps the user to find a free parking spot based on different metrics. Second, it recommends a route from the user's current location. Third, it provides the real-time provision of expected availability of parking areas in a user-friendly manner. Finally, it provides a GDPR-compliant implementation for operating in a privacy-aware environment (Saleem et al., 2022).

A parking management system for disabled people named DisAssist is developed by Lambrinos & Dosis (2013). The parking system is developed using IoT technology and smart cities' capabilities by integrating smartphones, sensors, and mobile/wireless communications. DisAssist offers real-time availability information about parking lots for disabled persons and allows them to reserve parking lots.

FINAL REMARKS AND FUTURE WORK

Traditional parking systems equipped with ramps and controlled by employees that regulate the entry and exit points in the parking system are becoming increasingly obsolete. The fast development of various ICT solutions offer new approaches in smart parking design. The use of one of the new technologies - IoT in smart system design is explored in this paper. First we described IoT system design and explained four key layers in all IoT-based systems, named physical layer, network layer, middleware layer, and application layer. After that, smart parking systems are explained and an example of smart parking system design is provided. Finally, the integration between IoT and smart parking design is illustrated.

In this theoretical paper we have tried to systemize the IoT concept, smart parking architecture and their interconnection. Many recent papers described only one of these concepts (IoT or smart parking) and only a few dealt with their integration. In future research the more extensive explanation of different sensors, technologies, and protocols can be provided. Particular focus of future work can be on routing algorithms customized for deployment in the parking system. The investigation of machine learning techniques and their use in predicting the state of parking lots in the near future can be examined. Furthermore, the implementation of an IoT-smart parking architecture in real environment can be explored.

ACKNOWLEDGMENT

This research has been supported by the project "Development of innovative solutions with the aim of improving the field of traffic and transport".

REFERENCES

Biyik, C., Allam, Z., Pieri, G., Moroni, D., O'Fraifer, M., O'Connell, E., Olariu, S., & Khalid, M. (2021). Smart Parking Systems: Reviewing the Literature, Architecture and Ways Forward. *Smart cities*, 2, 623-642.

Ilin, V., Saulić, N, & Simić, D. (2021). Parking information systems for central zones of a city. In *11th International Symposium Engineering Management and Competitiveness (EMC 2021)*, Zrenjanin, Serbia, 66-71.

Kim, T-h., Ramos, C., & Mohammed, S. (2017). Smart City and IoT. *Future Generation Computer Systems*, 76, 159-162.

Lambrinos, L. & Dosis, A. (2013). DisAssist: An Internet of Things and Mobile Communications Platform for Disabled Parking Space Management, In *IEEE Global Communications Conference (GLOBECOM)*, 2810–2815.

Latif, S., Afzaal, H., & Zafar, N. A. (2018). Modelling of Graph-Based Smart Parking System Using Internet of Things, In *IEEE International Conference on Frontiers of Information Technology (FIT)*, 7-12.

Mainetti, L., Marasovic, I., Patrono, L., Solic, P., Stefanizzi, M.L., & Vergallo, R. (2016). A Novel IoT-aware Smart Parking System based on the integration of RFID and WSN technologies. *International Journal of RF Technologies*, 7(4), 175-199.

Martinez-Balleste, A., Perez-martinez, P.A., & Solanas, A. (2013). The pursuit of citizens' privacy: a privacy-aware smart city is possible. *IEEE Communications Magazine*, 51(6), 136-141.

Perera, C., Liu, C., & Jayawardena, S. (2015). The Emerging Internet of Things Marketplace From an Industrial Perspective: A Survey, In *IEEE Transactions on Emerging Topics in Computing*, vol. 3, no. 4, pp. 585-598.

Puspitasari, D., Muhammad N., Hendrawan, A., & Asmara, R.A. (2021). Development of smart parking system using internet of things concept. *Indonesian Journal of Electrical Engineering and Computer Science*, 24(1), 611-620.

Saleem, Y., Sotres P., Fricker S., De La Torre C.L., Crespi N., Lee G.M., Minerva R., & Sanchez, L. (2022). IoTRec: The IoT Recommender for Smart Parking System. *IEEE Transactions on Emerging Topics in Computing*, 10(1), 280-296.

Shingare, A., Pendole, A., Chaudhari, N., Deshpande, P. & Sonavane, S. (2015). GPS supported city bus tracking & smart ticketing system, In *IEEE International Conference on Green Computing and Internet of Things*, 93-98.

ON STANDARDIZATION IN THE FIELD OF USER INTERFACES

Goran Janaćković
University of Niš, Faculty of Occupational Safety, Niš, Serbia
Dejan Vasović
University of Niš, Faculty of Occupational Safety, Niš, Serbia
E-mail: djnvasovic@gmail.com
Bojan Vasović
Academy of Applied Studies South Serbia, Leskovac, Blace department, Serbia

ABSTRACT

Computer work is becoming part of daily work activities of an increasing number of employees, regardless of whether it is their main or additional work activity. They do their work activities from home or at the office using the available equipment. Equipment specifications and limitations can lead to certain difficulties in human-computer interaction, where data entry via input devices and display of data on output devices are the causes of some of these difficulties. Standardization of the user interface is one step towards the solving the problems of human communication with computers, because defining adequate characteristics of user interface elements, established meaning and way of displaying key elements on screens allows fast interaction and unambiguous presentation of information. This paper presents representative ISO standards related to the user interface.

Key words: User interface, Standardization, Performance.

INTRODUCTION

Although safety is considered in organizations as a support activity, it is very important for achieving organizational goals. In addition to affecting organizational functioning and achieving continuity of core business activities, reducing the risks causes the improvement of employees' performance and well-being (Savić et al., 2021). Risk analysis primary considers work processes and equipment used at work, as well as aspects of the environment (Mušicki et al., 2020, 2021). However, more and more often, part of the work activities are performed using desktop computers or portable devices and corresponding software executed on them. The characteristics of software aids can significantly affect employees' performance. Whether the software is used for business, educational or entertainment purposes, it needs to have certain features that make it functional for users and convenient to use. The way of presenting visual information, the size and color of letters, the shape and size of the basic elements on the desktop, as well as the way of presenting adverse events is the basis for flawless communication and timely response, which is very important in specific workplaces (Grozdanović et al., 2017). The speed of reaction to an adverse event can often be crucial in reducing or eliminating the consequences of adverse events.

Software risk and information security are increasingly attracting the attention of researchers (Janaćković et al., 2019). Efforts for standardization have not bypassed this area either, and in line with the development of knowledge, wider use and innovation, there has been a need to define clearer criteria for describing usability and risks (Bevan, 2001; Xie et al., 2016; Barafort et al., 2017). There is a need for standardized methodological approaches for their identification, analysis and reduction of negative consequences, as well as for adequate evaluation of user experience and identification of adequate assessment criteria (Guney, 2019; Zarour, 2020; Janaćković et al., 2020; Dawood et al., 2021). All of this is significant not only for special purpose software, but also for standard software used in everyday life, which also requires ease of communication, unambiguity and a logical arrangement of user interface elements. The introduction of generally accepted standards in the field

of user interface and software ergonomics can significantly facilitate the development of easy-to-use software.

STANDARDIZATION

The application of standards implies the implementation of certain, generally accepted in the industry solutions that are important, especially in the field of security and protection. Ergonomics of human-system interaction implies consideration and optimization of specific tasks in the communication process. Particularly important is the contribution to the application of occupational safety standards by defining safety conditions that result in a reduction in the occurrence of adverse events in the work environment that may endanger the health of employees (Bretschneider-Hagemes et al., 2018).

User interface

The user interface enables communication between man and machine, with the aim of effectively managing the process based on a sufficient column of information obtained from the process itself. Different types of interfaces that enable communication between users and computers, based on basic principles such as quality, uniformity and usability (Bevan, 2001; Dawood et al., 2021). In everyday work on computers, users most often use a graphical interface with mouse and keyboard, while mobile solutions can have a touch pad or touch screen as input device (for example, tablets). Sophisticated users can also use the command line, while special types of devices use menu-based interfaces. Modern research is aimed at developing conversational interfaces that will enable communication in spoken language or by using special gestures that are treated as executive commands.

Based on (ISO, 2020), the user interface is part of an interactive system, which consists of several elements. These elements enable the user to receive the necessary information from the system and to realize the necessary tasks through the available controls. ISO 9241-11:2018 standard defines the concept of usability in the context of interactive systems, which goes beyond ease-of-use, because it defines the extent to which the system can be used by corresponding users to achieve the required efficiency, effectiveness and satisfaction if used as intended and in a defined context (ISO, 2018). User experience includes user perceptions caused by the use of the system, based on user subjective and objective assessment of the functioning of a system. Special emphasis is placed on the development of the system in the context of simpler and more efficient use, with a greater focus on assumed human behavior and its responses. The Video Display Unit Directive 90/270 EEC (1990) emphasizes the significant characteristics of the software, including the suitability of the task and ease of use, as well as the obligation to apply the principles of software ergonomics.

Representative ISO standards

There are number of standards related to human-computer interaction, from those related to the ergonomics of the interaction, consideration of usefulness and specificity of the user interface implementation (Lee, 2014; Green, 2020; Norman and Kirakowski, 2018; Karwowski et al., 2021). A representative series of standards, ISO 9241, defines interfaces for human-computer interaction, with special emphasis on the importance of humane work design and requirements that must be met, primarily reducing physical and mental strain caused by the use of computer equipment (ISO 9241-11:2018). The basic principles of ergonomics of human-system interaction are described using main interaction principles, among which suitability, self-descriptiveness, learnability and conformity with user expectations should be emphasized (ISO 9241-110:2020).

The following tables provide an overview of representative standards related to software ergonomics, with special emphasis on the user interface and its elements. Although there is a significant relationship between these standards and other standards related to information technology and ergonomics of computer system hardware elements used to interact with a computer, such as a

keyboard, they are not considered here. The table shows the name of representative standard, brief description, classification and current status (development stage).

Table 1 shows representative standards form the ISO/IEC 11581 series of standards. These standards describe characteristics of main graphical user interface elements presenting objects, pointers, tools, actions, and interaction modes. A large number of standards from this group are standards with a long tradition, which have gone through the process of confirmation.

Table 1: Standards for different user interface objects, their functions and representations

Standard	Description	Classification	Stage
ISO/IEC TR 11580:2007	User interface objects, actions and attributes framework	35.240.20	Confirmed (90.93)
ISO/IEC 11581-1:2000	Icon symbols and functions - Icons - General	35.240.20	Confirmed (90.93)
ISO/IEC TR 11581-1:2011	User interface icons - introductory analysis of icon standards	35.240.20	Published (60.60)
ISO/IEC 11581-2:2000	Object icons	35.240.20	Under review (90.20)
ISO/IEC 11581-3:2000	Pointer icons	35.240.20	Under review (90.20)
ISO/IEC 11581-5:2004	Tool icons	35.240.20	Confirmed (90.93)
ISO/IEC 11581-6:1999	Action icons	35.240.20	Review finished (90.60)
ISO/IEC CD 11581-7	Icons for setting interaction mode	35.240.20	Close of comment period (30.60)
ISO/IEC 11581-10:2010	Framework and general guidance on user interface icons	35.240.20	Confirmed (90.93)

The next table shows representative standards from the ISO/IEC 20071 series of standards. Their primary goal is to propose how to present different kinds on information to be understandable to users. Sometimes it is necessary to present alternatives of images in textual form or to put additional textual description for audio information.

Table 2: Representative user interface standards from the ISO/IEC 20071 series

Standard	Description	Classification	Stage
ISO/IEC 20071-5:2022	Accessible user interfaces for accessibility settings on information devices	35.240.20	Published (60.60)
ISO/IEC 20071-11:2019	Guidance on text alternatives for images	35.240.20	Published (60.60)
ISO/IEC TS 20071-15:2017	Guidance on scanning visual information for presentation as text	35.240.20	Review finished (90.60)
ISO/IEC TS 20071-21:2015	Guidance on audio descriptions	35.240.20	Confirmed (90.93)
ISO/IEC 20071-23:2018	Visual presentation of audio information (including captions and subtitles)	35.240.20	Confirmed (90.93)

Table 3 presents additional user interface standards that are not classified only as IT applications in office work (classification number 35.240.20), describing the describing the multidisciplinary character of the problem under consideration. Among others, they analyze usability, cursor control, cultural elements, navigation devices, virtual keyboards, readability and legibility of presented textual material.

As can be seen from the previous tables, most of the standards are confirmed. With the development of technology in recent years, there is a need to introduce new standards that will regulate this area in more detail.

Table 3: Additional user interface standards and their current status

Standard	Description	Classification	Stage
ISO/IEC CD 4944	Natural user interfaces usability assessment	13.180, 35.180	CD study/ballot initiated (30.20)
ISO/IEC 10741-1:1995	Cursor control for text editing for the purpose of dialogue interaction	35.240.20	Confirmed (90.93)
ISO/IEC 13066-1:2011	Interoperability with assistive technology (AT) - Requirements and recommendations for interoperability	35.180; 11.180.99	Review finished (90.60)
ISO/IEC 13251:2019	Collection of graphical symbols for office equipment	35.020; 01.080.20	Published (60.60)
ISO/IEC 15897:2011	Procedures for the registration of cultural elements	35.060; 35.240.99	Under review (90.20)
ISO/IEC 17549-1	Framework for UI requirements and recommendations on menu navigation	35.240.20	Published (60.60)
ISO/IEC 17549-2:2020	Navigation with 4-direction devices	35.240.20	Published (60.60)
ISO/IEC DIS 17549-3	Navigation with 1-direction devices	35.240.20	Close of voting (40.60)
ISO/IEC DIS 22121-2	Virtual keyboards user interfaces - On-screen keyboards with touch interface	35.180	Approved as FDIS (40.99)
ISO/IEC 18035:2003	Icon symbols and functions for controlling multimedia applications	35.240.20	Confirmed (90.93)
ISO/IEC 18036:2003	Icon symbols and functions for WWW browser toolbars	35.200	Confirmed (90.93)
ISO/IEC TR 19764:2005	Cultural and linguistic adaptability in information technology products	01.120; 35.240.20	Confirmed (90.93)
ISO/IEC DIS 23859-1	Guidance on making written text readable (legible) and understandable	35.240.20	Close of voting (40.60)
ISO/IEC 24755:2007	Screen icons and symbols for personal mobile communication devices	35.240.20	Confirmed (90.93)

DISCUSSION

There is a number of standards that describe the characteristics of human-computer interaction. They are increasingly becoming the subject of analysis. Although the fields of ergonomics and information technology are characterized by the need for detailed analysis, the number of these standards can often be repulsive to potential users. This sometimes unjustifiably raises the question of their purpose or need (Stewart, 2000). The ISO 9241 series standard contains a number of parts, grouped in areas, from software ergonomics, through interaction processes, to physical input devices and means of displaying information. In addition, they describe the principles of dialogue and presentation of information, the criteria for the analysis of physical input devices, as well as the framework and recommendations for tactile, haptic and gestural interactions (Green, 2020).

It is very important to consider the usability of the process, which is described at a high level by the ISO/IEC 6502x series of standards. They describe how user requirements are specified, report on user needs, and describe the context of use. ISO/IEC 11581 standards define various user interface objects, actions that a user can perform and object attributes, object icons, pointer icons, action icons, tool icons, as well as icons to define the interaction mode. Some standards that define software ergonomics are in the process of being review. For example, ISO 14915-2: 2003 standard for software ergonomics of multimedia user interfaces will be replaced by the ISO/CD 9241-115 standard, which will describe user-system interaction design, user interface design and navigation.

The need for standardization also arises from user comments. The most common user complaints on the UI are shown in the following table. These relate to non-compliance with user requirements,

complexity in performing certain routine operations, difficult identification of interface elements, and unnecessary routine operations.

Table 4: The most common user complaints

Complaints	Description
User requirements	The UI does not reflect user needs; not all necessary elements or actions are implemented.
Complexity	Performing certain routine operations requires additional mental effort of the user or the order of execution of actions is not intuitive.
Elements identification	UI elements are not visually recognizable compared to other desktop elements or the appearance does not associate their purpose.
Unnecessary routine activities	It takes more activities (accessing menus, opening dialogs, clicking the mouse) than those to which the user is accustomed.
Non-intuitive commands	Commands (especially gestures or voice commands) differ from local culture or tradition.

Different users may interpret certain elements of the user interface differently. Also, the local interpretation of certain elements may differ from one area or country to another, making it difficult to implement the user interface by adding new specific requirements. Therefore, it is necessary to define and use symbols of universal meaning, in which standards can also be helpful. Due to the different physical abilities of users, assistive technologies are becoming more and more important, which enable users with certain limitations to use computers normally. The ISO/IEC 13066 series standard defines the requirements and recommendations for the interoperability and functionality of such devices, i.e. what these devices are expected to provide to users.

Alternative representations of certain content, such as appropriate text instead of images, or visual representations of audio information, are presented in the ISO/IEC 20071 series of standards. This group of standards describes, among other things, how to scan visual information for display in textual form. Standard ways of displaying user interface elements in the form of cursors, icons, navigation menu need to be supplemented by new ways of communicating with devices, including pen gestures (ISO/IES 14754) and voice commands (ISO/IEC 30122). The introduction of gestures and voice commands leads to new problems, which are primarily related to inappropriate localization. For example, the meaning of a certain gesture is not the same everywhere.

CONCLUSION

Software development is often not accompanied by adequate standardization, due to the large number of innovations and rapid changes in industry trends. The development of an appropriate standard is much slower than changes in the software market, so certain solutions proposed by the standards are often unfairly ignored. Software design, primarily in the field of human-computer interaction, i.e. the characteristics of the work environment, can benefit from the application of standards. When introducing standards, attention should be paid to better identification of user requirements, taking into account their needs, as well as limitations, cultural differences and habits, in order to translate these requirements into the implementation of better interfaces.

ACKNOWLEDGMENT

The paper presents the results of research supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Agreement No. 451-03-68/2022-14/200148).

REFERENCES

Barafort, B., Mesquida, A.-L., & Mas, A. (2017). Integrating risk management in IT settings from ISO standards and management systems perspectives. *Computer Standards & Interfaces*, 54 (3), 176-185.

Bevan, N. (2001). International standards for HCI and usability. *International Journal of Human-Computer Studies*, 55 (4), 533-552.

Bretschneider-Hagemes, M., Korfmacher, S., & von Rymon Lipinski, K. (2018). The role of standardization for occupational safety and health (OSH) and the design of safe and healthy human-computer interaction (HCI). In Duffy, V. (eds) *Digital human modelling - applications in health, safety, ergonomics, and risk management*, DHM 2018, Lecture notes in computer science (LNISA), 10917, Cham: Springer, 19-28.

Dawood, K. A., Sharif, K. Y., Ghani, A. A., Zulzalil, H., Zaidan, A. A., & Zaidan, B. B. (2021). Towards a unified criteria model for usability evaluation in the context of open source software based on a fuzzy delphi method. *Information and Software Technology*, 130, 1-15.

Green, P. (2020). ISO Human-computer interaction standards: finding them and what they contain. Proc. of the HFES 64th international annual meeting, 400-404.

Grozdanović, M., Marjanović, D., Janaćković, G. Lj., Đorđević, M. (2017). The impact of character/background colour combinations and exposition on character legibility and readability on video display units. *Transactions of the Institute of Measurement and Control*, 39 (10), 1454-1465.

Guney, Z. (2019). Considerations for human–computer interaction: user interface design variables and visual learning in IDT. *Cypriot journal of educational science*, 14 (4), 731-741.

ISO (2018). *ISO 9241-11: 2018, Ergonomics of human-system interaction — Part 11: Usability: definitions and concepts*. International Organization for Standardization, Geneva: Switzerland.

ISO (2020). *ISO 9241-110:2020, Ergonomics of human-system interaction — Part 110: Interaction principles*. International Organization for Standardization, Geneva: Switzerland.

Janaćković, G., Mušicki, S., Vasović, D. (2019). Information technology risks: management, standards, and methods. Proc. of the IX International Symposium Engineering Management and Competitiveness 2019 (EMC 2019), Zrenjanin, Serbia, 179-184.

Janaćković, G., Mušicki, S., Vasović, D. (2020). Information security management standards: a Serbian experience. Proc. of the 10th International Symposium Engineering Management and Competitiveness 2020 (EMC 2020), Zrenjanin, Serbia, 67-70.

Karwowski, W., Szopa, A., & Soares, M. M. (2021). *Handbook of standards and guidelines in human factors and ergonomics*. *2nd ed*. Boca Raton: CRC Press.

Lee, D. H. (2014). Review of ISO standards on human-system interaction published during 2008-2013. *Journal of the Ergonomics Society of Korea*, 33 (5), 433-452.

Mušicki, S., Janaćković, G., Vasović, D. (2020). Standardization and system standards usage in the field of occupational and environmental safety. 10th International Symposium Engineering Management and Competitiveness 2020 (EMC 2020), Zrenjanin, Serbia, 89-92.

Mušicki, S., Janaćković, G., Vasović, D. (2021). OHS management: development perspectives defined by ISO 45000 series of standards. Proc. of the XI International Symposium Engineering management and Competitiveness 2021 (EMC 2021), Zrenjanin, Serbia, 102-107.

Norman, K. L., & Kirakowski, J. (2018). *The Wiley handbook of human computer interaction (Vol. 1)*. Hoboken, NJ: John Wiley & Sons Ltd.

Savić, S., Stanković, M., & Janaćković, G. (2021). *Teorija sistema i rizika – sistemnost u kontekstu menadžmenta rizikom*. Beograd: Akademska misao, Niš: Fakultet zaštite na radu u Nišu.

Stewart, T. (2000). Ergonomics user interface standards: are they more trouble than they are worth? *Ergonomics*, 43 (7), 1030-1044.

Video Display Unit Directive 90/270 EEC (1990). Council Directive 90/270/EEC on the Minimum Safety and Health Requirements for Work with Display Screen Equipment. *International journal of comparative labour law and industrial relations*, 6 (3), 209-215.

Xie, Z., Hall, J., McCarthy, I. P., Skitmore, M., & Shen, L. (2016). Standardization efforts: The relationship between knowledge dimensions, search processes and innovation outcomes. *Technovation*, 48-49: 69-78.

Zarour, M. (2020). A rigorous user needs experience evaluation method based on software quality standards. *Telecommunication, computing, electronics and control*, 18 (5), 2787-2799.

Session F: ABSTRACTS

Abstracts (pp. 281-282):

ARTIFICIAL INTELLIGENCE AND BUSINESS MANAGEMENT: OPPORTUNITIES AND CHALLENGES

Tashfeen Ahmad
The University of the West Indies, Jamaica
E- mail: mrtashfeen@hotmail.com

ABSTRACT

Artificial Intelligence has changed the way we manage and market our businesses. This presentation will highlight various examples of management and marketing where AI has disrupted what we learn in traditional business courses. The examples given will be from various sectors and will help you rethink your concepts of what AI can do by sensitizing you with what AI is already doing. Online available data was collected on how businesses in various sectors are incorporating AI to improve their functions and what are the challenges they are facing. From this information, a way forward was developed for the students to prepare a "future proof" career in business management. Major finding is that the universities need to improve the way they are preparing their students for the future of commerce. The presentation will also help you rethink your career path in light of emerging trends in business management. This study is a generalized study and gives an overall state of affair instead of giving a detailed AI adoption in a particular country. This presentation will help undergraduate students in rethinking their strategy as they prepare for a career in commerce, marketing and management.
This presentation will share some business ideas to inspire your entrepreneurial thinking.

Key words: Artificial Intelligence, Management, Business, Opportunities, Skills.

Author Index

Z, Ž

EMC2022

12th International Symposium "Engineering Management and Competitiveness" 2022

ISBN 978-86-7672-353-9