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NATION BUILDING AT THE SUB-STATE LEVEL

Milena Milosavljevic Stevic*

*Faculty of Business Studies and Law, University "Union - Nikola Tesla" Belgrade, Republic of Serbia,
e-mail: milena.milosavljevic.stevic@fbsp.edu.rs



Abstract: The process of nation-building at the sub-state or sub-state level is a difficult and complicated process that, in addition to members of minority groups, includes a number of actors such as political elites, the home state and international organizations. The comprehensiveness and diversity of the actors involved in this process are not a guarantee of its success.

Nation-building at the sub-state level should be seen in the context of the majority nation-building process, because it arises as a reaction to it. The dialectic of majority building and sub-state building of the nation coincides in certain aspects, but there are also significant deviations. A limiting factor in both processes is the rights of minority groups. Guaranteeing minority rights is a necessary condition for the legitimacy of majority nation-building, while on the other hand, the rights of internal national minorities in certain territories or regions that insist on autonomy and independence are an indicator that shows the direction in which nation-building is going at the sub-state level. Kosovo, after the Declaration of Independence in 2008, represents an example of illiberal nation-building at the sub-state level, which aims to weaken the minority community of Serbs in Kosovo.

Multinational states face the problem of nation-building at the sub-state level. In political theory, the question is open: why in the process of globalization do sub-state nations gain importance when state sovereignty weakens? This is precisely the main argument, because minority groups maximize their political demands in crisis situations of the host country, i.e. in moments when its sovereignty is being challenged. The example of the Albanians in Kosovo and Metohija, as well as in the south of Serbia and in North Macedonia clearly point to this.

Keywords: nation-building at the sub-state level, sub-state nations, minority rights, majority nation-building, minority nationalism

Field: Social sciences

1. INTRODUCTION

The process of nation-building at the sub-state level (led by minority groups and their leaders) is complex and is viewed in the context of majority nation-building, more precisely as a response to that process and policy. The nation-building process is accompanied by a feeling of inferiority and illegitimacy of minority groups, although the normative frameworks of individual countries point to a different state of minority rights.

In political theory, there are different viewpoints on nation building. In the analysis of sub-state nationalism, liberals opened up an old question in political theory: the nature of the democratic state and the nature of the demos in the state, focusing on the relationship between citizens and the state. According to the point of view of liberal pluralists, the natural reaction of national and ethnic minorities to the majority nation-building process is the mobilization of minority communities and the creation of their own national states (A. Dumaev). Liberal pluralists believe that combining (majority) nation-building and minority rights is legitimate, with certain limitations, while liberals denied their existence, advocating the myth of ethno-cultural neutrality. Liberal nationalists believe that (majority) nation-building has positive goals, which has been contested by ethno-cultural pluralists. David Miller raises an important question: if national loyalty is the basis of political association, what attitude should we take towards ethnic identities, the substance of which does not have to be in agreement with the national identity itself?

2. MAJORITY NATION BUILDING

The term "national building" or "building a nation" in political theory became attractive in the 50s and 60s of the 20th century, although its roots can be traced back to the French Revolution (1789). Members of the American academic community including Carl Deutsch, Charles Tilly and Reinhard Bendix were the main advocates. First, this term was supposed to describe "the processes of national integration and consolidation that led to the establishment of the modern nation-state, which is distinguished from the various forms of traditional states, such as the feudal state, the church state, and the Empire." Sub-state cultures and loyalties that either disappeared or lost their political importance were replaced by loyalty to a larger entity, the state. However, in the 1970s, the discussion about "nation building" went in a different

*Corresponding author: milena.milosavljevic.stevic@fbsp.edu.rs



direction when Walkner Connor published a paper called "Nation Building or Nation Destruction?". Connor felt that the state was preoccupied with social cleavages, and that ethnic heterogeneity was ignored. Since nation-building in the German tradition meant assimilation into the wider society and the eradication of ethnic particularities, Connor believed that this process in world history produced more nation-destruction than nation-building (Kolsto, 2000, p.17).

Majority nation-building is not incompatible with Western liberal democracy, on the contrary, but it is subject to certain limitations. Western liberal democracies, which are the main proponents of multiculturalism, do not renounce a strong policy of nation-building, which is combined with granting minority rights. According to the Canadian author Will Kymlicka, this would imply the following: "the presence of nation-building policies justifies minority rights, and the adoption of minority rights helps to justify the state's nation-building" (Kimlicka, 2002, pp. 62). In Western liberal democracies, the conception of national identity and national integration should be pluralistic. However, the author Taras Kuzio believes that some "Eastern" states in post-communist Europe have the character of "citizen nations", they are even more "civil" than Western states, because they "offered citizenship to all those who had a residence in their territory, which is not was a practice in Western countries". Unlike Western, Eastern European and Central European states, they are characterized by "historical nation-building" under the rule of great empires (J. Schefflin), which significantly influenced their character and the further process of nation-building (Kimlicka, 2002, pp. 60-67). Violent past, "the curse of the little ones difference" and unresolved political conflicts, make up the Western Balkans a problematic region that is under the watchful eye of the great powers (Djoric, 2024, 73).

The issue of minority nationalism should not be viewed in isolation from sub-state nation-building. On the contrary, in that case minority nationalism is strengthened. The mentioned countries have the following in common: 1. separate language groups have become increasingly territorialized, and certain languages are dominant within certain regions; 2. territorialized language groups in these countries demand greater political and self-governing rights within the federal system, i.e. multinational federation. This would mean that territorialization and federalization are closely related. Territorialized ethnic groups manage to realize self-governing rights, and language has become the most important boundary of political communities. As a result, these states become federations of self-governing language groups, which define themselves as "multinational federations". David Miller warns of the differences between ethnicity (which should be treated as a private matter) and nationality (which is a political phenomenon). Linguistic recognition is characteristic of ethnic groups. According to Miller, it happens in practice that ethnic groups pass into the domain of nationality, for which there is no justification, but it cannot be privatized. In this sense, a nation is often formed from an ethnic group that is dominant in a separate territory and bears the characteristics of that group: language, religion, cultural identity (Miller, 1995). Will Kymlicka believes that democracy is realized in a better way within linguistic subunits, because participation is ensured in a better way, while at higher levels it is under the influence of the elite (Kymlicka, 2001, p. 213).

3. NATION BUILDING AT THE SUB-STATE LEVEL

The problem of politics and the process of nation-building at the sub-state level is expressed in multinational states, where national minorities strive to realize self-governing rights and establish their own nation-building policy, which is designated as "sub-state", "sub-state nation-building" or "second-level dialectic of nation-building" nations" (Will Kymlicka). National minorities respond to the majority nation-building project by demanding greater territorial and political autonomy, which would enable them to build their own nation, and they begin with demands for the establishment of self-government.

National minorities use self-government to adopt their own nation-building policies within federal units or autonomous territories (Kimlicka 2002: 62). Although the term "self-government" is reserved for "preservation of societal cultures", in the case of certain minority groups such as Albanians and Hungarians, this term has acquired an emphasized political and territorial dimension, the basis of which is culture. During the communist regime in SFRY, Hungarian nationalism and segregationism, nor Vojvodina's bureaucratic autonomy on the territory of the province of Vojvodina, were not considered, as if they did not represent a "political fact" (Čosić, 2012, p. 22).

Constitutional design allows states to deny multi-ethnicity or to accommodate particular national identities. Failure to accommodate particular or minority identities manifests itself in four cases: 1. the constitution does not recognize the multi-ethnic nature of the state; 2. denying minority groups to participate in the decision-making process; 3. sub-state minority groups do not have control in the process of submitting constitutional amendments; 4. minority groups lose the autonomy they previously enjoyed

(Tierney, 2008, p. 510). According to the opinion of liberal nationalists, the central place in the process of sub-state nation-building is the right to self-determination (self-determination). Sub-state nationalists first start from the demand for constitutional changes that would adapt to the multi-national character of the state, and reach for the strategy of "constitutional interpretation" (Tierney, *Ibid*, pp. 514-515). The Constitution of 1974 provided for the "right to self-determination" which was reserved for federal units, i.e. for peoples if they wanted to leave the federation, and not for "nationalities" of national minorities who had national and territorial claims, such as the Albanians in Kosovo who called for this right. In the 1980s, there was a dispute about this term in the political discourse.

The Constitution of the SFRY from 1974 states that the right to self-determination is granted to the peoples: "the peoples of Yugoslavia, starting from the right of every people to self-determination, including the right to secede, based on their freely expressed will in the joint struggle of all peoples and nationalities in the national liberation war and socialist revolution, and in accordance with its historical aspirations". According to Yael Tamir, the right to self-determination should be a cultural demand, not a political one, defined as "the right to preserve the existence of the nation as a separate cultural identity" supported by political solutions or arrangements such as territorial autonomy, federalism, confederalism, etc. (Tamir, 2002, p. 122). The right to self-determination is different from secession. The unilateral declaration of Kosovo's independence in 2008 represents "the last example of the exercise of the right to self-determination", i.e. an example of "illegal secession" which is in contradiction with international public law, because it is carried out against the will of the central authorities (Mitrović, 2014, pp. 992). In order to maintain its independence, the nation-state must have not only internal cohesion, but also military and economic strength and defensible territory, so that it is not annexed by hostile forces or overrun by criminal and terrorist organizations (Hazoni, 2021, 193).

After the collapse of the Socialist Federal Republic of Yugoslavia (1945-1992), new national states (which within the SFRY had the status of federal units) were established on its territory. Newly formed national states on the territory of the former Yugoslavia represent an example of ethno-nationalized societies, created by the disintegration of the SFRY, during the 1990s. Ethnonationalized societies represent a "regressive direction of the social constitution" where there is a "return to the nation" at any cost, which means a return to tradition, turning to the past, reaffirmation of traditional values, restoration of the social role of religion... (Pandurević, 2021, 16).

Sub-state nationalists challenge the sovereignty of the host state in different ways using many methods. In practice and rhetoric, sub-state nationalists combine legal and political elements of sovereignty. According to Martin Loughlin's definition, sovereignty is "generated as a product of the political relationship between the people and the state." This relationship appears in the discourse of sub-state nationalists. For them, the idea of "people" should have a pluralistic dimension; and the sovereignty of a multinational state cannot only mean "the relationship between the people and the state", but must be "the relationship between the peoples who together make up the state and the state itself" (Tierney, 2005, pp. 162).

Among the Albanians in Kosovo, there is a "separate nationalism" that is characterized by the suppression of individualism and the destruction of political institutions (Orlović, 2008, pp. 222), which experienced its manifestation in full light in the nineties of the 20th century. This type of nationalism is characteristic of post-communist societies. Nevertheless, the separatist aspirations of the Albanians appear earlier, even before the famous session of the Central Committee of the Union of Communists of Serbia (1968) when the "father of the nation" Dobrica Ćosić opened the "Kosovo question" pointing to the chauvinism and separatism of the Albanians. That is, the general public was aware in 1956 of the existence of an illegal separatist movement that is illegally arming itself and aspiring to establish a "Greater Albania". Since the Albanian uprising in Drenica in 1945 against the inclusion of Kosovo and Metohija in Yugoslavia, i.e. Serbia, there has been a widespread awareness among Albanians and communists of their main national goal - unification with Albania and the creation of a "greater Albania", which was proclaimed by the League of Prizren in 1878. (Čosić, 2013, p. 12).

Albanians as well as their political leaders in Kosovo and the south of Serbia also rely on a historical myth, more precisely the myth of the Illyrian origin of the Albanians. According to the Illyrian point of view, the historical territory of the Albanians, i.e. the Albanian state, would in the future extend from Lake Skadar in Montenegro in the north, to the Gulf of Ambraki in Greece in the south, as well as from the Adriatic Sea to the Treska River in Macedonia, including Preševo, Bujanovac, Medveđa and Lebanon (Sotirovic, 2013, p. 9). This idea will remain present from the beginning of the Albanian nationalist movement called "Albanian National Revival" (Alb. Rilindja Kombëtare), which operated from 1878 - 1913, and the political activities of the First Prizren League (1878-1881), until the establishment of the Albanian terrorist paramilitary the KLA terrorist organization and the current actions of Albanian political leaders. The Illyrian theory of Albanian ethnic origin is the most popular theory in the construction of the Albanian nation, especially among

politicians, intellectuals, and scientists from the 19th and 20th centuries (Milosavljević Stević, 2023, p. 160). According to this theory, Albanians are the descendants of the Illyrians, an authentic nation, and an indigenous population who have historical rights over the territories (which were inhabited by the Illyrians), unlike the Serbs, Montenegrins and Macedonians who are labeled as “foreigners” who do not have these rights. Also, according to the Illyrian theory, the Illyrian-Albanian historical and ethnic rights in Kosovo and Metohija are fifteen centuries older than the historical and ethnic rights of the Serbs (Sotirovic, 2013, p.8).

The “separate nationalism” of the Albanians was followed by demonstrations, which, according to Baysinger’s theory, represent a prelude to secession. Demonstrations by students and high school students from 1981 in Kosovo indicate the maturity of the ethnic self-awareness of the Albanian national community. This event was supported by numerous intellectuals such as Behljiu Bečaj (president of the Association of Political Scientists in Kosovo), who believed that: the Republic of Kosovo “is not a paradise for Albanians, just as it is not hell for Serbs and others living in Kosovo”, and that it represents “a forced product reality”, and “a mechanism for protecting the national identity of Albanians” (Milosavljević Stević, 2023). The Constitution of SFRY from 1974, based on the universalistic conception of national identity, within which the particular ones are integrated, enabled the creation of privacy and the intensification of the particular or secessionist pretensions of the Albanians in Kosovo. Dimitras and Papanikolatos consider the following: “if Serbia had maintained the autonomy of Kosovo under the Constitution of 1974, this province would have been part of the Federal Republic of Yugoslavia, perhaps as a republic” (Dimitras and Papanikolatos, 2002, p.174).

4. FAILED STATE-BUILDING PROCESS IN KOSOVO

After the democratic changes in Serbia in October 2000, the Democratic Opposition of Serbia was committed to protecting the country’s territorial integrity, consistent implementation of UN Security Council Resolution 1244, “guaranteeing the rights of all residents of Kosovo”, encouraging their “integration into the country’s democratic institutions” (Vladisavljević, 2019, 179).

Sub-state nation-building, on the one hand, ensures the protection of societal cultures of national minorities that inhabit a certain territory in dominant numbers, while on the other hand, it multiplies the problem of numerically inferior national groups that have found themselves in that territory. The policy of sub-state nation-building fails to ensure the protection of the so-called of “internal minorities”, in contrast to majority nation-building, which includes the protection of minority groups, on the basis of which it derives legitimacy. Newly formed states created from the administrative areas of the former SFRY were faced with the challenges of affirming the ethno-cultural diversity of the “new” national minorities. The example of Croatia after secession from the SFRY shows that the states after gaining independence were not able to solve the problem of new or internal minorities (Serbs - as the most numerous national minorities). Croatian political leaders after gaining independence rejected the demands of the Serbs for the territorial autonomy of Krajina, offering them a minimal form of cultural autonomy without political self-government, which resulted in conflicts.

In the Balkans, the term “national minority” is perceived by minority groups as a pejorative term. Albanians in Macedonia and Kosovo believe that they have been “degraded” to minorities and that this is incompatible with their demands (Dimitris and Papanikolatos, 2002, pp. 175). If we start from the position that the national minority represents “a part of the people that has its own home country, but lives on the territory of another country”, then in the context of the entire country, Albanians in Serbia are a minority, and not Serbs in Kosmet who “live in an Albanian majority environment are exposed insecurity and fear for national and individual existence (Orlović, 2008, p. 224). The example of Kosovo (with the majority Albanian ethnic group, and “internal minorities” - Serbs, Goranians, Roma, Turks...) clearly shows that the process of sub-state nation-building is short-lived and unsustainable, and that “illiberal nation-building” is at work. In fact, “internal minorities” represent the main limitation of sub-state nation-building. The Kosovo problem was and remains entangled in the contradictions between the Albanian minority in Serbia and the Serbian minority in Kosovo (Ibid).

Just as in the case of majority nation-building, the respect and affirmation of minority rights are a necessary condition, so also in sub-state nation-building, the affirmation and equal relationship of “internal minorities” is important in order for that process to be legitimate. The analysis of the state of human and minority rights in Kosovo, from the sixties of the 20th century until today, indicates that this is a failed nation-building process at the sub-state level, and that from the very beginning that process was doomed because it failed to meet the minimum liberal and democratic principles.

An important role in sub-state nation building is played by the mother country. Political leaders from Albania, in order to exert influence on their members on the territory of Kosovo and Metohija and arouse

irredentist aspirations. They were often reminded of the common origin and united state of all Albanians, which is based on the Illyrian theory of ethnic identity of Albanians. Unlike the communists in the former SFRY who tried to diminish the importance of nationality, the communists in Albania tried in different ways (through education, i.e. history textbooks) to strengthen the ethnic self-awareness of Albanians by emphasizing the Illyrian roots of Albanians (Milosavljević Stević, 2023, p. 160). Although the position of the international community in the 1990s was that it was necessary to respect the sovereignty and inviolability of the borders of the Republic of Yugoslavia, Albania was the only country that recognized the “Republic of Kosovo” in 1991, and in 1996 insisted that Albanians in Kosovo should accept autonomy within Serbia (Orlović, 2008, pp. 224).

The process of sub-state nation-building in Kosovo has its roots in the beginning of the crisis of federalism in the former SFRY. At the famous session of the Central Committee of the Union of Communists of Serbia, held on May 29, 1968, when inter-ethnic relations were discussed, the emergence of chauvinist feelings and separatist goals that have existed since 1966 were discussed. In the former SFRY, the real inequality of the Serbs in the Federation was labeled as “Serbian nationalism” or “hegemonism”, and “the difficult situation of the Serbs in Kosovo and Metohija and their flight to Serbia were first spoken by Serbian nationalists and anticommunists, people who were labeled as “Serbian reaction”” (Ćosić, 2013, p. 11).

After the arrival of UNMIK and KFOR, after the NATO aggression against the FRY (1999) which was carried out in order to protect the minority rights of Albanians, there followed a mass exodus from Kosovo, as well as displacement within Kosovo, primarily of Kosovo minorities, especially Serbs, Roma and in some areas Albanians. The Yugoslav Red Cross announced that there were 234,000 displaced Serbs and Roma in Serbia and Montenegro by October 1999 (Baldwin, 2006, p. 20). In the period from June 1999 to the violence of March 2004, more than 220 thousand Serbs and other non-Albanians were expelled from the province, and 120 Christian shrines and monuments were devastated and destroyed (Government of the Republic of Serbia).

According to the author Andrea Lorenzo Kapusela, NATO’s intervention in the Federal Republic of Yugoslavia and the secession of Kosovo created opportunities for the construction of a state in Kosovo. The territory of Kosovo and Metohija (Kosovo and Metohija) is “the scene of the most expensive, intensive and ambitious state-building experiment ever attempted, which began in June 1999 and continued until today” (Kapusela, 2016, p.13). According to Kapusela, the state-building process in Kosovo failed for several reasons. State building in Kosovo failed to ensure democracy, economic prosperity and stability. Despite the efforts of the international community, Kosovo is the most unstable region. In addition, minorities in Kosovo, especially Serbs, are exposed to threats to their security and survival, although according to Ahtisaari’s plan, Kosovo is committed to providing a high level of protection for minorities. Minorities are excluded from the main social and political stream, based on which we can conclude that the Government of the self-proclaimed state of Kosovo leads an exclusivist policy towards minorities. Although there are reserved seats in the Assembly of Kosovo for minorities (10 seats for Serbs, and the remaining 10 for Roma, Ashkali, Egyptians and Gorani), they cannot influence the decisions of the Albanian political elite. Marginalization and exclusion of minority communities is a practice, and this is supported by the State Department’s report on respect for human rights in 2015, which states that in addition to the Roma, the Serbian minority is also exposed to violence by the Albanian majority. 250 cases involving violence against the Serbian minority were registered (Milosavljević Stević, 2023, p. 50).

As we stated, when building a nation at the sub-state level, national minorities do not use the policy of naturalization and military service in nation building. However, Kosovo deviates from this practice. Ahtisaari’s plan envisaged the formation of a “multi-ethnic security unit”, but a larger number of Western armies present in Kosovo are making an effort to strengthen the Kosovo army, where the German Bundeswehr plays an important role. Kosovo Defense Minister Ejup Macedonci signed the Framework Military Agreement with Turkey in January 2024, which includes the deepening of military cooperation (Kosovo online 2024). For the purpose of building a state in Kosovo, the Assembly of Kosovo adopted the Law on Citizenship, which foresees the naturalization of foreign persons, where it is stated, among other things, that a foreign person obtains the citizenship of the Republic of Kosovo, if he meets the conditions, among which is the recognition of the constitutional and legal order of the Republic of Kosovo, as and elementary knowledge of one of the official languages in the Republic of Kosovo and culture. After the unilateral declaration of independence in 2008, Kosovo represents an example of illiberal nation-building, where a “decentralized tyranny” was established, and the Serbs were put in a Kafkaesque situation. After the Visa Liberalization Agreement (2009) signed between the representatives of the Republic of Serbia and the European Union, a Coordination Administration was formed that issued passports to Serbian citizens from Kosovo, which are also proof of citizenship of the Republic of Serbia, however, the Kosovo

government did not allow Serbs to cross the border with these documents from Kosovo, which followed a series of incidents at border crossings to which Serbs are exposed. This forced Serbs and other non-majority communities to request identification documents from the Kosovo Ministry of Interior. This is just one example of forced integration into the legal order of Kosovo, more precisely a territory that is not internationally recognized, and where the only legal provisional government of Serbia is in Kosovo.

5. CONCLUSION

The process of sub-state nation-building is a very complex and difficult process, regardless of the number of actors involved. Even the efforts of the international community as a key actor in the process of sub-state nation building, with the support of political elites, Albanian citizens and social forces, were not enough for that process to succeed, because there is an absence of international recognition, and it still represents a more unstable region in the Western Balkans. There is no doubt that such a forced process has left consequences on the relations between the ethnic communities in Kosovo. From the former integration of Albanians (at the time of the existence of the SFRY), through the coexistence of Serbs, Albanians, Goranis, Roma and Ashkali, we come to the antagonism of Albanians against all the mentioned minority groups. The example of Kosovo has shown in the most obvious way that Western principles cannot maintain the order of a unilaterally destroyed state of Kosovo, although the USA and some EU member states recognized the independence of Kosovo. Why is it so? In the paper, using the theory of liberal multiculturalism of Will Kymlicka, we showed that Western principles tailored to the American ethnic mosaic cannot be exported to other parts of the world, because they cause conflicts. This is indicated by the latest events in Ukraine, Azerbaijan (Nagorno-Karabakh), as well as in Israel. In 2007, Francis Fukuyama, analyzing the situation in Afghanistan, Somalia and Kosovo, stated that the United States of America and the international community managed to correct the mistakes of the past that they committed in Panama, Somalia, Haiti and Bosnia during their stabilization. Taught by experience until the time when the nation-building initiatives in Kosovo and East Timor appeared in 1999 and 2000, the US government and the international community managed to establish better methods of internal coordination and establish better institutional mechanisms in nation-building, however, the Bush administration she denied it. According to Fukuyama, the problem facing the external powers is "to ensure short-term stability by introducing security forces, police and obtaining humanitarian technological assistance to restore electricity, water, banking, payment systems..." (Fukuyama 2007:114). This leads to the conclusion that the "humanitarian interventions" of Western countries, intended to protect minority rights, multiply antagonisms by offering short-term solutions for social and political stability. It is difficult to talk about the establishment of democracy in the absence of respect for universal human rights. It follows that Western principles are unsuitable for Southeast Europe, because it is characterized by a diametrically opposite historical context, the process of majority nation-building, political history, as well as political culture, and it is unreasonable to expect the success of the aforementioned principles bearing in mind this context.

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EFFECTIVE MANAGEMENT OF PUBLIC FINANCES - OVERVIEW OF HIGHER EDUCATION INSTITUTIONS IN SERBIA

Aleksandar M. Damnjanović^{1}, Snežana Maksimović¹, Vesela Vlašković¹*

¹Faculty of Business and Law, MB University, Belgrade, Serbia
e-mail: adm.tfc@gmail.com, galena.mcl@gmail.com, veselacurkovic@yahoo.com



Abstract: The research examines the essential approaches to the concept of management responsibility in public administration, which implies the true commitment of managers and employees to use public funds in the correct way in their daily work. Through a theoretical analysis of the relevant literature and key drivers of reforms and an empirical assessment of the quality of the established system of financial management and control through the Consolidated Annual Report on the State of Internal Financial Control in the Public Sector, the goal work is to point out that there are significant needs to improve management in institutions of higher education in Serbia, based on report the findings and recommendations of the state audit institution. The framework of public policies for higher education in Serbia in the context of higher education reforms does not only refer to their basic activity, but also integrity, transparency and responsibility in the management of the funds at their disposal, performance-based financing and quality assurance, which contributes to the effective functioning of the market and economic growing. Modest progress in this sense indicates that these institutions have not fully established the basis for good governance. The findings of the research sample are the higher education institutions that were subject to the control of the state audit institution in the previous two years, and through the analysis, the authors of this work include recommendations of audit related on management responsibility in relation to the integrative components of financial management and control. The concluding considerations point to a fundamental misunderstanding of the holders of management functions of the purpose and role of internal control mechanisms in the management system, which is a prerequisite both for the implementation of legal regulations and for effective business operations.

Keywords: management responsibility, public finances, public policies, state audit, internal control

JEL Classification: L38, M14, O22, P43

1. INTRODUCTION

The concept of management responsibility in the management of public finances requires the users of public funds to set clearly defined goals and responsibility for work within the framework of delegated competences within which the responsibility of managers is focused on performance, and not only on compliance with regulations. In the Republic of Serbia, the legal aspect of managerial responsibility originates from the concept of Internal Financial Control in the public sector, which was introduced into the legal framework through the Law on the Budget System (Tojnisen & Deker, 2022). The prerequisites for the successful establishment of effective internal financial control, and thus the concept of managerial responsibility, which is the subject of analysis in this paper, are compliance with regulations, structural reforms of public financial management and budget reforms. Considering the systemic approach in the article we start from theoretical considerations that show good practices and the way in which the concept of management responsibility is implemented in the European Union, but also as an added value of a modern management system. In the very review of the concept of management, we consider the continuous effect of management actions which by influencing the parameters of the system, translate the system from one state to another. In the context of efficient management of public resources through the audit findings, we consider the selection and implementation of management actions that in higher education institutions in Serbia that were the subjects of the audit translate the business system from the existing to a new state. Achieving the set goals, that is, the realization and development of the system and the functioning of the system, must be directed, which is the management of system. This implies that the management of the institution should have experts in the fields of law, finance, economics and management, who are sufficiently experienced in performing entrusted responsibilities. The number of irregularities in the integrative components of financial management and control and acting on audit recommendations indicates the degree of stochasticity of the management process, which, depending on the actions taken, decreases and establishes a certain determinism, i.e. adequate management. Management responsibility implies that the concepts of responsibility, authority and competence are interconnected, so it is precisely through the relationship of their interdependence, overviewed on the

*Corresponding author: adm.tfc@gmail.com



basis of the report of the state audit institution in the business of higher education institutions, consider all results through all aspects of management from planning to reporting, and from delegation to control.

2. THEORETICAL FRAMEWORK

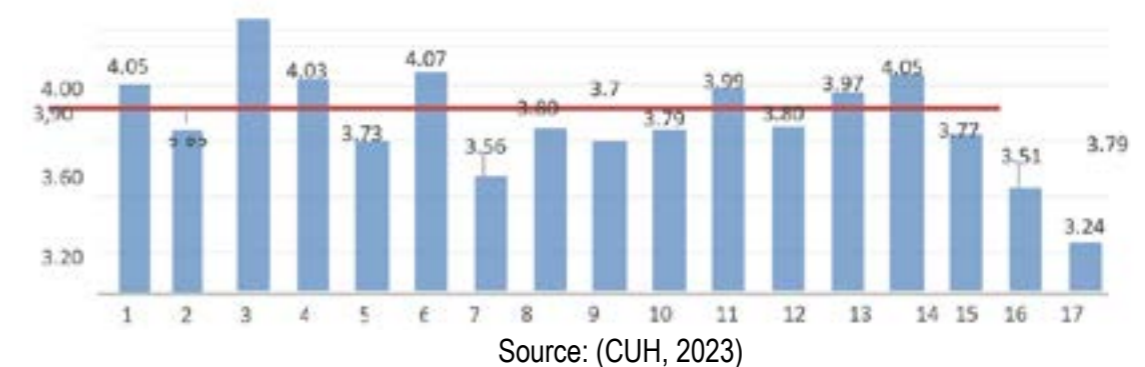
The concept of management responsibility of users of public funds is a prerequisite for the establishment of the Internal Financial Control System and is often considered a key issue in reform processes and during the dialogue with the European Commission. There is no unified definition of management responsibility that could be applied to all situations and to all users of public funds. Theories that are important for the development of managerial responsibility represent a set of different disciplines such as finance, accounting, law, human resource management, quality and risk management, organizational behavior and others. It refers to all processes related to decision-making, that is, the appropriate organization, procedures and reporting on the results of the organization (CUH, 2023). In its explanations of internal control mechanisms in the public sector, the European Commission gives its definition of management responsibility precisely to clarify the duties of managers, their obligations and responsibilities in terms of regulation, but also efficient business operations (European Commission, 2012). All members of the European Union, through reform processes in their public administrations, have been considering aspects of good governance for decades and approached these processes in different ways. The general approach to reforms was intensified during the 1990s, where the focus was on the principles of good management, and areas related to internal controls were intensified since 2000. This could be explained by the recognition of the importance of the principles of good management, the importance of control mechanisms, and in this sense the recognition the need for risk management but also by the introduction of quality management mechanisms in public administration. In this period, the implementation of internal control mechanisms through business processes in public administration organizations is becoming widely used and of vital importance among the most important users of public funds in many European Union countries. The reform processes in the last 15 years in public administrations in the majority of 28 public administrations have experienced fundamental changes (this especially applies to France, the Netherlands and the UK), and in particular it refers to the component of the control environment (SIGMA, 2004). All member states give their observations, so in the Spanish contribution on progress in reform processes it is stated that the importance of control mechanisms should not be considered separately in the economy in relation to the public sector, especially when we look at it in the context of change management, which is becoming inevitable in today's changing environment. (Chaparro et.al, 2006). In this context, it is important to note that the way in which internal controls function and the way of their implementation is constantly being improved. The development and improvement of controls primarily refers to their focus on goals and performance management. This means clearly defining goals in all business segments and implementing controls wherever there is a risk of goal achievement or partial achievement, including the responsibility of managers in relation to the efficiency and quality of public service provision, cost efficiency and reporting responsibility. All this implies the introduction of quality standards, international and national standards of accounting and auditing, clearly defined legal regulations and clearly defined role of internal and external audit. users of public funds (Maksimović et.al, 2023). In the higher education institutions in Serbia, which are the subject of the research of this article, there is not a sufficient essential understanding of the purpose of internal control mechanisms, and the conditions for effective management responsibility, which requires a stimulating legal framework, an ethical environment, an inspiring "tone at the top" and a focus on business processes, that mostly have not been created (Maksimović, 2003). In accordance with the traditional way of management, the focus of management and control is most often on monitoring the execution of the budget and spending of financial resources, as well as compliance with legal requirements (SVOS, 2023). There is no focus on business processes or an organizational culture focused on efficiency and effectiveness, achieving goals in budgeting according to performance (EACEA, 2017). Within the framework of the reform processes of public administration in Serbia, in the process of EU accession, all institutions are required to use a modern way of management, which implies the establishment of a plan or road map for the goals that need to be achieved, determining the means for the implementation of the plan in accordance with the stipulated deadlines, as well as determining what was actually achieved in comparison with the originally planned, determination of deviations and reasons for deviations, as well as their inclusion in the original plans and decisions on allocation of funds (Hepworth, 2009). Management bears responsibility, which requires transparency. Accountability depends on the clarity and comprehensibility of the reporting, as well as the capacity of the employees to whom the information is submitted for review, consideration and challenge (ReSPA, 2018). Public policies in the field of higher education in Serbia imply certain

organizational changes, but do not consider significant management changes (SROSRS, 2021). The framework of public policies in reform processes recognizes in its priorities the orientation towards results in the business of higher education institutions, transparency and availability of data, quality assurance, ethical codes, the importance of accurate determination of costs and the importance of non-financial reporting (WB, 2022). The questions which arise in the context of management responsibility in institutions of higher education in Serbia are numerous, first of all these are questions in terms of their effective and efficient business according to the result, also the role of internal control in the management system, which is a prerequisite for the implementation of legal regulations. On the other hand, limitations are imposed in the context of the institutional autonomy of these institutions and the supervision of their operations.

3. RESEARCH CONTEXT

Directly related to management responsibility is the better performance of the users of public funds. Within the framework of the reform processes of public administration in Serbia, it is precisely the increase in performance that is of essential importance. It is necessary to approach the concept of managerial responsibility in the correct way, and not only in the sense of holding managers accountable for the achievement of set goals. In our article, we are looking for answers to the questions of how to achieve positive results and achieve efficiency, effectiveness and legal business in accordance with the regulations in the context of a proper approach to management, which implies, in addition to better performance, greater participation and involvement of employees, greater commitment and motivation, an increased sense of competence, a greater degree creativity, established communication in the management of unforeseen events, which corresponds to adequate proceeding in all integrative elements of financial management and control. Positive results are achieved when employees perceive the concept of responsibility as a useful and advanced way of assigning and fulfilling work duties. For example, managers who involve employees in the process of defining goals and expectations will notice that employees have a clearer picture of what is expected of them and have greater confidence in their ability to achieve those expectations, and in general, perform at a higher level (CUH, 2023). The concept of management responsibility primarily implies a focus on internal financial control procedures aimed at improving management in accordance with international standards (COSO, 2013) and good EU practices. By looking at the quality of the established system of financial management and control according to the last annual consolidated report of the central unit for harmonization of the Ministry of Finance of the Republic of Serbia, users of public funds rated the level of application of the KOSO principle with an average of 3.9, which indicates that there is room for its improvement, but they are prioritized users rated with 4.15 the established level of the system (CUH, 2023). There is room for improvement, especially when it comes to indirect budget users, which includes institutions of higher education that are the subjects of observation in this paper.

Graph 1. Average grades of the COSO principle, Source (CUH, 2023)



The main intention of this article is the analysis of audit reports in institutions of higher education in order to identify irregularities in the integrative areas of financial management and control and to respond to audit recommendations, because in this segment the leadership role of the top management is key, who is expected to throughout the organization, but also externally, communicates a clear message about behavioral standards and the importance of the FUK "tone at the top" of system (Maksimović et.al, 2023). The presented results include audit control reports at four state universities, 27 faculties, 3 colleges and colleges of vocational studies, 7 academies of vocational studies and one academy of (Pejović,

2023). In the report of the state audit institution, which was presented at a conference in the rectorate of the University of Belgrade, it was pointed out that there is an inadequate and incompletely established system of financial management and control in all observed entities, which results in identified errors and irregularities. (Pejović, 2023). It were given 762 recommendations by accounting areas, of which 172 recommendations related to the area of financial management and control (Pejović, 2023). The most critical area is in the area of established control activities, where as many as 81 recommendations were given. We have to notice that the management of higher education institutions does not understand the essence and importance of establishing control mechanisms as well as their implementation through processes, even when defining them (Pejović, 2023). The average rating of this element in the annual consolidated report of the Central Unit for Harmonization of the Ministry of Finance of the Republic of Serbia is something better, which we presented in the previous graph, than at the higher education institutions that were the subject of audit, which indicates that the priority users of public funds are aware of the importance of control activities in their organizations (CUH, 2023). The concept of managerial responsibility also implies adequately established control activities, especially for the reason that they are carried out throughout the organization, at all levels and functions and by all employees, in accordance with the established business processes and job description. With their help, it is known who is doing what, who is in charge of a certain activity/process, and who is responsible. The control activities are of crucial importance for business efficiency, but also for the continuity and economy of the way work is done. Also, represent a number of different activities in the organization, such as approvals, authorizations, verifications, reconciliations, reviews of operational success (performance), asset security and division of duties. In the context of this article's research of managerial responsibilities at higher education institutions would imply assuming responsibility for all aspects of management, from planning to reporting, and from delegation to control.

4. DISCUSSION OF RESULTS

Experiences in the application of managerial responsibility among users of public funds in Serbia are recent, but they are one of the priorities within the reform processes of public administration. Institutions of higher education in that context are particularly specific, due to their autonomy, so the question arises as to how much supervision higher education institutions need to fulfill social expectations on the one hand. The other aspect is in terms of their efficiency, modernization and operations in accordance with the laws, so it is necessary that management structures of these institutions clearly understand their role and responsibility. In the narrative report of the state audit institution in the concluding remarks, it is stated that the institutions of higher education that were the subject of the audit did not organizationally establish an adequate FUK system because they did not implement all activities and did not adopt/ update the basic documents for establishing the system (Pejović, 2023). It is also stated that they did not align the financial management and control - FMC system with the principles of the "COSO" framework, which ensures a positive control environment, good risk management, control activities that will reduce risks to an acceptable level, necessary information and communications in the field of internal controls, as well as monitoring and evaluation of the FMC system, which creates a risk that goals and objectives will not be achieved in a proper, economic, efficient and effective manner (Pejović, 2023). For the aforementioned improvements, the improvement of administrative capacities is necessary, and the managers of these institutions should have unique abilities and experts in the fields of law, finance, economics and management, who are sufficiently experienced in performing entrusted tasks. Such experts must also clearly understand their roles and responsibilities as civil servants in relation to state enterprises. In addition, the highest management should also be able to have the resources to receive advisory services from the outside, in order to operate as efficiently as possible. They could, for example, engage specialist evaluations, active monitoring, or external auditors when deemed necessary and appropriate. In the context of management responsibility, the key leadership role of top management. It is necessary that managers, by their own example, i.e. their activities and responsible behavior in general (commitment to respecting moral principles, communication, management, determining organization's resources to implement internal controls in terms of additional training) encourage the creation of an appropriate organizational culture and a generally favorable environment for the development of the financial management and control system and achieving the overall goals of the organization. In addition, it is necessary to organize the legislative framework at the state level, i.e. regulatory compliance, planning and performance control systems, good communication with the founder/competent ministries, quality management structure, financial discipline and financial and non-financial reporting. In the part of management and leadership, it is important to point out that faculties have discretion in the use of their own income, but that the absence of clear criteria for

acquiring their own income causes them to be spent without criteria, because higher education institutions have not determined the way of their distribution. In addition, higher education institutions did not apply criteria when determining tuition fees and administrative fees, which make up the largest part of their own income. The structure of school fees is not transparent, and the largest part of the institution's own income is spent on salary increases for its employees (Pejović, 2023). From all of the above, we can conclude that in accordance with the goals of structural reforms at higher education institutions, it is necessary to improve the situation in management and leadership, as well as in business control. Internal auditing has not been introduced at any higher education institution, but if necessary, they hire an internal auditor from the competent ministry. In the context of improving management responsibility, the internal acts of the faculty established transparent procedures for the selection of deans and management bodies, their competences and responsibilities are clearly defined within the current business, but for the improvement of management, also it is necessary to systematically arrange public policies in this area. An effective driver can be a policy – supported by related implementation strategies – that actually delivers better results in the system. Effective drivers generate a concerted, accelerating force for progress toward reform goals. They can be internal, which includes efforts to achieve set goals, or external, such as compliance with laws, in any case, an effective driver is one that achieves better measurable results.

5. CONCLUSION

The modern way of managerial of public funds requires that the management process be viewed in a broader sense, which means that the focus of management is not on monitoring the execution of the budget and spending of financial resources, as well as compliance with legal requirements, the attention is paid to the achievement of goals and performance standards and, consequently efficiency and effectiveness in spending public financial resources. An important component of management responsibility is the adequate establishment of control mechanisms in terms of internal control mechanisms (procedures and structure) that are needed to ensure that organizations comply with the law (financial management and control, internal audit) and external mechanisms (state audit, budget inspection, audit financial statements by external auditors. The importance of internal controls in the context of managerial responsibility implies the establishment of good administrative procedures, the provision of financial resources for work, the monitoring of the disposal of funds and the management of income, expenses, assets and liabilities. Rukovodstvo mora da zna da li je raspolaganje sredstvima bilo dobro. Management must know whether the disposal of funds has been good. Therefore, the management must carry out an evaluation and analysis of the expenditure in comparison with the services rendered and the public interest achieved. The monitoring process takes place throughout the year, while the evaluation is carried out at the end of the financial year. In order to establish the concept of managerial responsibility, institutions of higher education should change the current way of management. This requires the existence of responsibility for work within the framework of clearly assigned, that is, delegated competences within which the responsibility of managers is focused on performance, and not only on compliance with regulations. Performance expectations must be clearly linked and aligned with capacities, and control activities should also be established in cases where performance expectations have not been met. For effective management are important the management principles of responsibilities and stimulating legal framework, ethical environment, focus on processes, awareness and motivation of managers. The findings of the audit indicate that institutions of higher education in Serbia should undertake numerous activities in order to establish adequate internal control mechanisms and improve the concept of managerial responsibility in order to operate more efficiently. This requires, first of all, increasing professionalism in work, defining clear strategies and goals, developing clear performance indicators, establishing policies for evaluating the work of employees, improving reporting and, above all, strengthening the control environment. In this article, the authors want to highlight the importance of managerial responsibility in the context of achieving better business results, although it is a recent topic and not sufficiently applied in higher education institutions that are the subject of this paper's research. We believe that the concrete benefits of the principle of management responsibility, which we highlighted in the paper, will be good initiators of reforms, which will ensure their further development and improvement of the application of this concept in practice.

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THE RELATIONSHIP OF EMPLOYEES TOWARDS THE IMPLEMENTATION OF THE POLICE-INTELLIGENCE MODEL IN THE REPUBLIC OF SERBIA

Ilija Racić^{1*}, Siniša Dostić¹, Dragan Paunović²

¹Faculty of Business Studies and Law "Union - Nikola Tesla" University, Belgrade, Republic of Serbia,
e-mail: ilija.racic@gmail.com, sinisa.dostic@fbsp.edu.rs

²University of Business Studies Banja Luka, Republic of Srpska, Bosnia and Herzegovina
e-mail: dragan_paunovic@yahoo.com



Abstract: The aim of this research is to scientifically describe the relationship of employees towards the implementation of the police-intelligence model using scientific research methods. The police-intelligence model, as an important part of the public security management system working, has been recently implemented in the Serbian security system. As such, it demands certain adjustments and changes within the system in order to adopt the system to the new police-intelligence model. Every organizational change, such as the establishment of a new working method like the police-intelligence model, creates resistance among employees. The main reason for this is the established and traditional working method of employees resisting change, despite the fact that the implementation of such a proactive model, as is police-intelligence, significantly contributes to the increased effectiveness and performance of police work, which positively reflects on the state of public safety in the Republic of Serbia. The research was conducted as theoretical-empirical, combining both theoretical and empirical research methods. However, the results of empirical research indicated deficiencies reflected in insufficient support from strategic and regional level leaders, a reduction in resistance among employees due to the lack of education of all police officers, and raising awareness of the position and the role of all employees in the implementation of the police-intelligence model.

Keywords: employees, police-intelligence model, implementation, change resistance

Field: Social Sciences, and Humanities.

1. INTRODUCTION

The contemporary concept of the world security has dramatically changed in the last two decades (Paunović, 2020). The Serbian security concept has been passing thru these challenges as well. Its integral security system consists of two main elements. The first of them is the external security element, while another is the internal security element that protects the public safety system from anti-social danger factors as well as from other endanger facts (Dostić, et al., 2022). The part of that is related to the innovative approaches needed to tackle these security challenges where the police-intelligence model plays a crucial role. The research of the police-intelligence model implementation in the Republic of Serbia up to now has shown that the functioning of this model could be improved. That means certain functional and organizational changes including the changes in conducting the intelligence work in combating the crime (Racić, et al., 2024). One of the key elements of the police-intelligence model (beside structural and functional elements) includes elements of the model's relationship with the environment, which fundamentally includes: 1) internal organizational environment (internal legal framework, employee attitudes towards the application of the police-intelligence model, legality, ethics, and integrity of employees); AND 2) external organizational environment (external legal framework, multi-sectoral cooperation, and coordination of activities with citizens and partner institutions) (Racic, 2022). This theoretical-empirical research specifically addresses the segment of employee attitudes towards the implementation of the police-intelligence model, which is particularly conditioned by necessary organizational changes as a consequence of implementing new work procedures that are predominantly based on enhancing certain functions of criminal intelligence work through the application of modern information technologies (Tomasevic, et al., 2019).

The degree of readiness of the police organization towards change is conditioned by several factors (Carter, 2009). For example, the choice of organizational self-assessment as a method, will facilitate the process, especially if undertaken to assess the existing state and improvement of police work, compared to rigid police organizations where resistance to change is particularly expressed among the middle management and police officers, which is also characteristic for the establishment of the police-intelligence model (Ratcliffe, 2008). Therefore, organizational changes in the police organization are mainly aimed at adapting the organizational structure to improve their performance, where employees

*Corresponding author: ilija.racic@gmail.com



represent a key source, resource and subject of change (Janicijevic, 2007).

During the implementation of the model, leaders adhere to the fact: "the police-intelligence model worked there, so it will work here," which is considered incorrect. Hence, it is necessary for leaders to adapt the model to the existing police organization and carry out necessary organizational changes that will help employees objectively identify problems and determine how those problems can be best resolved in reality. Another disadvantage is the basic human tendency to act in a familiar environment. At the same time, it is essential to keep in mind that the police-intelligence model is a proven proactive model and it is not a magical solution for any problem and it cannot be applied where there are organizational problems. Even the best-standardized model will appear ineffective if other state bodies, such as judicial authorities, do not have sufficient capacity for criminal prosecution (Clowes, N. et al., 2013).

Investigating theoretical views, according to Stevanovic's opinion, change is understood as a process of proactive or reactive transformation or adaptation of the organization to the existing or future changes (situations, conditions, needs, expectations, demands, or constraints) in the internal and external (political, economic, sociological, technological, legal, ecology) environment, with the aim of their effective and efficient operation, i.e., survival, growth, or development, compatible with the conditions and demands of the changing environment (Stevanovic, 2019).

2. METHODS AND METHODOLOGY

The research employed general scientific, logical, and empirical methods. Among the general scientific methods used in this research, the comparative and statistical methods were applied. The logical methods included: analysis (descriptive and explicative analysis), synthesis, generalization, induction, and deduction. By analyzing the available literature using the content analysis method in the police forces of developed countries, including countries in the region, it can be concluded that there are no studies whose results pertain to employee attitudes and the subject applying to the support of the management, including the resistance from leaders and employees in application of the implementation of the police-intelligence model.

The survey method was used to obtain the views and opinions of respondents, for which survey questionnaires were created. The survey was conducted on a sample of 109 employees, of whom 85 were male, making up 80% of the total number of employees, and 24 were female, making up 20% of the total number of employees in the police of Serbia ($\chi^2 = 10424$; $df = 1$; $p < 0.001$) in the period from May to November 2022, and 33 employees in the period from January to April 2024. The employees were selected using a disproportionate stratified sample method based on certain criteria, including: professional and experiential characteristics, professional and competent knowledge of the employees in organizational units based on the application of criminal intelligence functions (data collection) and the production of criminal intelligence information.

3. RESULTS OF THE RESEARCH

The results of the conducted theoretical and empirical research are divided into two parts. The first part presents the results of theoretical research, which addressed the problems of employee attitudes towards the implementation of the police-intelligence model in the police of the Republic of Serbia. The second part pertains to the value attitudes of employees regarding the implementation of the police-intelligence model.

3.1 The Problems of Employee Attitudes Towards the Implementation of the Police-Intelligence Model in the Police of the Republic of Serbia

Establishing the police-intelligence model in the police of the Republic of Serbia, in addition to organizational problems, led to the resistance from leaders and employees in its application. The primary reason was the lack of education not provided to all the police officers. The employees were not sufficiently familiar with the criminal intelligence process and the specific tasks they needed to carry out. There were no management groups, and standardized forms were unfamiliar to employees. The introduction of a new term, such as criminal intelligence information, posed a problem for analysts who had previously created analytical reports using established methodologies. Standardizing the form and content of security problem profiles and security-interest profiles required knowledge of modern analytical tools, to identify threats and risks, the projection of the movement of trends, and to provide adequate recommendations. Creating criminal intelligence information took analysts a lot of time, which hindered

the regular performance of specific tasks. Such information was delivered to the management in paper form without being presented to them, thus, having very small practical value.

Operational group meetings for leadership and management were not held according to standardized agendas, which hindered the decision-making process. It was important to fill out the form and draft a report, while the topic of the meeting was not to consider security problems, direct work on a series of criminal acts or misdemeanors, and focus on recidivists. This approach certainly represented resistance among employees.

The formation of a project team for the establishment of the police-intelligence model and the creation of a plan for its implementation influenced the quality of the execution of all functions in the process. This was influenced by the support of the Minister of Internal Affairs, who attended the meetings of the Strategic Group for Leadership and Management during the establishment of the process and emphasized the importance of using the model. By creating the first Strategic Public Safety Assessment and operational public safety assessments in regional police departments, security problems are identified in the territory of the Republic of Serbia, and activities begin to proceed proactively. The project team provided support to leaders of operational groups for leadership and management through continuous presence at management group meetings, holding joint meetings in the form of "round tables," and through the first conducted evaluations in the application of the police-intelligence model.

3.2 Value Attitudes of Employees towards the Implementation of the Police-Intelligence Model

The results of the theoretical research on employee attitudes towards the implementation of the police-intelligence model were empirically tested by surveying 109 police officers (members of the Strategic Group for Leadership and Management in the Police Directorate and operational groups for leadership and management in 27 regional police departments - hereinafter referred to as the results of the empirical research as "Study 2022") and 3 main coordinators in the headquarters of the Police Directorate, 4 main coordinators in organizational units in the headquarters of the Police Directorate, and 27 coordinators in regional police departments - hereinafter referred to as the results of the empirical research as "Study 2023." The aforementioned employees answered the research questions as presented in tables 1-3.

Table 1: Employee Responses in Organizational Units in the Headquarters of the Police Directorate and Regional Police Departments on the Question: "Evaluate the Level of Leadership Support to the Implementation of the Police-Intelligence Model"

Surveyed RPD and OU in PD Headquarters	Avg. value ± SD	Insufficient		Satisfactory		Good		Very Good		Excellent		Total	
		n	%	n	%	n	%	n	%	n	%	n	%
Study 2022	3.00 ± 0.82	2	1.8%	13	11.9%	30	27.5%	46	42.2%	18	16.5%	109	100%
Study 2023	3.62 ± 0.97	5	15.15%	11	33.33%	2	6.06%	15	45.46%			33	100%

Source: Authors'

Analyzing the distribution of frequency of ratings in the observed sample in Study 2022 for the question presented in Table 1, the level of leadership support towards the implementation of the police-intelligence model in the police of the Republic of Serbia was rated by the employees positively in 97.2% of cases with "excellent," "very good," "good," "satisfactory," and 1.8% rated with "insufficient." In the observed sample after some time in Study 2023, 84.85% positive ratings and 15.15% negative ratings were obtained, i.e., "insufficient" ratings. It can be observed that there is an increase in the frequency of negative ratings and the absence of the highest rating after some time. The observed samples are dominated by positive ratings of the level of leadership support towards the implementation of the police-intelligence model.

Table 2: Employee Responses in Organizational Units in the Headquarters of the Police Directorate and Regional Police Departments on the Question: "Evaluate the Level of Police Officers' (Executors) Support for the Implementation of the Police-Intelligence Model"

Surveyed RPD and OU in PD Headquarters	Avg. value ± SD	Insufficient		Satisfactory		Good		Very Good		Excellent		Total	
		n	%	n	%	n	%	n	%	n	%	n	%
Study 2022	2.75 ± 0.50	6	5.5%	26	23.9%	43	39.4%	32	29.4%	2	1.8%	109	100%
Study 2023	2.99 ± 0.93	5	15.15%	11	33.33%	17	51.55%					33	100%

Source: Authors'

Analyzing the distribution of frequency of ratings in the observed sample in Study 2022 for the question presented in Table 2, the level of support from police officers for the implementation of the police-intelligence model in the police of the Republic of Serbia was rated by the employees positively in 94.5% of cases with "excellent," "very good," "good," "satisfactory," and 5.5% rated with "insufficient." In the observed sample after some time in Study 2023, 84.85% positive ratings and 15.15% negative ratings were obtained, i.e., "insufficient" ratings. It can be observed that there is an increase in the frequency of negative ratings and the absence of the highest rating after some time. The observed samples are dominated by positive ratings of the level of support from police officers for the implementation of the police-intelligence model.

Table 3: Employee Responses in Organizational Units in the Headquarters of the Police Directorate and Regional Police Departments on the Question: "Evaluate the Level of Resistance (Opposition) from Leaders for the Implementation of the Police-Intelligence Model"

Surveyed RPD and OU in PD Headquarters	Neutral		Strongly (completely) Support		Generally Support		Generally Oppose		Total	
	n	%	n	%	n	%	n	%	n	%
Study 2022	19	17.4%	14	12.9%	68	62.4%	8	7.3%	109	100%
Study 2023	-	-	-	-	2	6.06%	31	93.94%	33	100%

Source: Authors'

Analyzing the responses of employees to the question presented in Table 3, in the observed sample in Study 2022, the level of resistance (opposition) from leaders to the implementation of the police-intelligence model in the police of the Republic of Serbia, was rated by the employees with the answer "generally support" and "strongly support" in 75.3% of cases, "generally oppose" with 7.3% rating and "neutral" in 17.4%. In the observed sample after a certain period in Study 2023, the positive rating "generally support" was obtained in 6.06% of cases, while 93.94% rated "generally oppose." It can be concluded that there was a significant increase in the prevalence of the response "generally oppose" and a decrease in the positive rating regarding the examined attitude.

4. DISCUSSION

The subject of theoretical-empirical research, whose results are presented in this paper, relates to the attitudes of employees towards the implementation of the police-intelligence model. The results of theoretical research on employee attitudes towards the implementation of the police-intelligence model revealed: 1) that the support of leaders at the strategic and regional levels is a crucial condition for the

successful implementation of the police-intelligence model; 2) that reducing resistance among employees presents a crucial process of educating all police officers and raising awareness of the role and the position of all employees in the implementation of the police-intelligence model.

Based on the conducted theoretical-empirical research, it can be concluded that the attitudes of employees towards the implementation of the police-intelligence model in the police of the Republic of Serbia can be improved by organizationally adapting to the requirements of police work based on the application of the police-intelligence model, which requires the following (organizational) changes: 1) the support of leaders and executors is a key condition for improving the functioning of the police organization, i.e., the effects (results and performance) of its work based on the application of the police-intelligence model in the police of the Republic of Serbia; 2) reduced resistance (opposition) from leaders and police officers (executors) is a key condition for improving the functioning of the police organization, i.e., the effects (results and performance) of its work based on the application of the police-intelligence model in the police of the Republic of Serbia.

5. CONCLUSION

Successful mechanisms for reducing resistance to eliminating the negative consequences of organizational changes are predominantly based on providing adequate communication and education to police officers, providing information on the usefulness of the model, ways of its successful application, and its effects on the police organization. Namely, organizational changes through the application of the police-intelligence model relate to those police officers who directly and indirectly apply the model in their daily work, so it would be desirable for such police officers to participate in the implementation of the model. During the implementation of the model, some police officers may resist changes, which requires negotiation and the establishment of a common agreement, especially when police unions are involved. Therefore, the support of leaders at the strategic level is an important factor for the successful application of the model, especially when middle and operational level leaders express opposing views and opinions.

In line with the described research results, it can be summarily concluded that the functioning of the police organization in the Republic of Serbia can be improved by organizationally adapting to the requirements of police work based on the consistent application of the police-intelligence model, which implies appropriate (organizational) changes supported by the attitudes of employees towards that work, with the aim of gaining their support for changes and weakening their resistance to changes.

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BASIC PERSONALITY TRAITS AS PREDICTORS OF PERFORMANCE TRAUMA SYMPTOMS IN SERBIAN RESIDENTS

Kristina Milutinović^{1}, Miljana Pavičević¹*

¹University of Priština in Kosovska Mitrovica, Faculty of Philosophy, Department of Psychology, Serbia,
e-mail: milutinovickristina34@gmail.com, miljana.pavicevic@pr.ac.rs



Abstract: The research aimed to determine the predictive power of basic personality traits (neuroticism, extraversion, conscientiousness, openness, aggressiveness, positive and negative valence) in predicting the occurrence of traumatic symptoms (symptoms of anxiety, depression, dissociation, traumatic experience, sexual problems and sleep difficulties) in people in Serbia. The sample consisted of respondents from Serbia, a total of 136 of them (30 male and 106 female respondents) with an average age of $AS=31.64$, $SD=8.09$. The following instruments were used in the research: The Big Five Plus Two, a shorter version (VP+2 - 70) and the Trauma Symptoms Checklist TSC-40. Individuals with high levels of neuroticism, who are introverted, and those who lean toward narcissistic tendencies will show symptoms of anxiety, depression, and sexual difficulties. High neuroticism and narcissistic tendencies may lead to the appearance of traumatic symptoms. The same, traumatised people have been found to have anxiety and low self-esteem, which was not the case with non-traumatised people. Traumatised people also scored higher on the neuroticism scale, and they were more introverted and less emotionally stable than non-traumatised individuals. Also, high neuroticism, introversion, rigidity in attitudes and narcissistic tendencies can lead to the appearance of somatic symptoms. The results obtained lead us to conclude that the respondents are prone to negative affect, rigidity in attitudes and behaviour, narcissistic tendencies, and that as such they have not developed adequate strategies for dealing with the demands of a complex environment, so that they will perceive all new situations as threatening.

Keywords: personality traits, traumatic symptoms.

Field: Personality psychology, Clinical psychology.

1. INTRODUCTION

Personality is usually defined as a complex set of psychological characteristics and mechanisms within an individual that are relatively permanent and organized and that influence a person's interactions and adaptations to the physical, intrapsychic and social environment (Larsen & Buss, 2008). In modern personality psychology, there has been a great deal of interest in the lexical approach to the study of the personality structure, which is based on the idea that the traits that distinguish people and that have been shown to be significant in everyday human experience, are encoded in language. Based on the lexical approach to the study of personality structure, three psycholexical studies were conducted in Serbia (Smederevac, 2000; Smederevac, Mitrović, Čolović, 2010; Smederevac and Mitrović, 2018), resulting in The Big Five Plus Two personality model (Smederevac, Mitrović, Čolović, 2010). The Big Five Plus Two personality model consists of seven basic dimensions: Neuroticism; Extraversion; Conscientiousness; Openness to experience; Aggressiveness; Positive valence; Negative valence.

Trauma is a state of high excitement and anxiety in which a serious threat or the experience of a serious threat exceeds the person's ability to cope with it (Hadžić, 2019; Stefanović-Stanojević, Tošić-Radev and Bogdanović, 2018). A traumatic experience occurs suddenly and unexpectedly, surpasses the person's capacity for self-defense and jeopardises the person's reference system, psychological needs and cognitive schemas (McCann & Pearlman, 2015). However, some research points to the frequent occurrence of trauma as an experience. Of the total number of respondents, 83.8 % stated that they had experienced a traumatic event before the age of seventeen, such as death of a close person, sexual abuse, parental divorce, violence, illness, and the like (Lovketić, V., 2023). Physical neglect stands out as the most common form of trauma. In a previously conducted survey, as many as 77.69 % of the respondents experienced physical neglect, and the majority of respondents from the sample as much as 61 %, within the limits of serious to extreme expression (Bogdanović, 2022). Traumatic experiences put a person's life and physical integrity in jeopardy, and might leave them feelings of helpless and terrified (Butollo et al., 2000). Humans have a sophisticated integrated system of reactions to danger that encompasses both their psychological and physical aspects. Psychological trauma symptoms primarily include excessive excitement, manifested as a persistent sense of impending danger, irritability in response to minor stimuli and restless nights, and numbness as a symbol of submission (Herman, 2012). The path and the results

*Corresponding author: milutinovickristina34@gmail.com



of the healing process from the trauma encountered are influenced by three categories of variables: 1) features of the traumatic event; 2) traits of the traumatized person's personality; 3) traits and responses of the traumatized person's surroundings. Personality traits affect howtraumatizing events are experienced (Schnurr & Vielhauer, 1999) and how one responds to them.

The role of neuroticism and its highly similar dimensions from different personality models (negative emotionality/negative affectivity) as a vulnerability factor for the development of psychopathological outcomes is consistently determined after traumatic exposure, as demonstrated by research on various samples (military and civilian) in which personality traits were measured before exposure to a traumatic event(Miller & Lynam, 2013).Previous studies (Andreson, 2017; Jakšić et al., 2012; Nelson, 2011; Park & Helgeson, 2006) have demonstrated a negative correlation between extraversion, conscientiousness, self-directedness, a combination of low negative and high positive emotionality, optimism and endurance with traumatic symptoms.Individualswho possess a strong positive outlook, confidence in both themselves and others,willingness to seek and accept help, to reconnect with others, and awareness of their own competence and initiative may find it easier cope with and recover from various traumatic situations. Building and strengthening the aforementioned aspects is an essential part of therapeutic work with traumatized individuals (Herman, 2012; Žuljević, 2019). Our focus lies in personality traits that are associated with an individual's qualities and resources, which can serve as a safeguard when facing traumatic events or as a source of support when the person is healing from trauma.

2. MATERIALS AND METHODS

The purpose of this study was to examine the predictive power of basic personality traits (neuroticism, extraversion, conscientiousness, openness, aggressiveness, positive and negative valence) in predicting the occurrence of traumatic symptoms (symptoms of anxiety, depression, dissociation, traumatic experience, sexual problems andsleep disorders) in Serbian residents.

The sample consisted of a total of 136 respondents from Serbia (30 male and 106 female) of average ageAS=31.64, SD=8.09.

The following instruments were used for the study: 1) Big Five Personality Inventory Plus Two short version (VP+2 - 70) (Čolović, Smederevac and Mitrović, 2014) intended to assess the degree of severity of seven basic dimensions: neuroticism, extraversion, conscientiousness, openness, aggressiveness, positive valence and negative valence. 2) Trauma Symptom Checklist TSC-40 (Šimić, Sesar and Barišić, 2012) intended to determine the presence of symptoms of anxiety and depression, traumatic symptoms, somatic symptoms and sexual problems.

3. RESULTS

Table 1 shows the descriptive indicators for the personality trait variable. The results show that conscientiousness, extraversion and openness are the most pronounced personality traits of the respondents. Therefore, conscientious, sociable people are open to new experiences.

Table 1. Descriptive indicators for the personality trait variable

	N	Min.	Max.	AM	SD
Neuroticism	136	10	46	21,45	8,07
Extraversion	136	19	50	39,41	6,03
Conscientiousness	136	15	50	41,16	6,83
openness	136	19	50	38,49	6,28
aggressiveness	136	10	49	23,33	8,43
Positive valence	136	15	50	31,83	7,00
Negative valence	136	10	30	14,04	4,53

Source:Milutinovic & Pavicevic

Legend: N-number of respondents; Min.-minimum; Max.- maximum; AS- arithmetic mean; SD- standard deviation

Table 2 shows descriptive indicators for the trauma symptoms variable. As the subscales contain a different number of items, the values were corrected by dividing the average value by the number of items of the subscale in order to be able to compare the severity of the aspects of the traumatic symptoms. The results show that the most pronounced aspects of traumatic symptoms are anxiety and depression

as well as somatic symptoms, while less pronounced are traumatic symptoms and sexual problems and difficulties.

Table 2. Descriptive indicators for the traumatic symptoms variable

	N	Min.	Max.	AM	SD	Corrected AM
Anxiety and depression	136	0	47	14,22	10,88	0,89
Traumatic symptoms	136	0	22	3,54	4,64	0,32
Somatic symptoms	136	0	24	7,56	4,80	0,84
Sexual problems	136	0	10	1,29	1,98	0,32

Source: Milutinovic & Pavicevic

Legend: N-number of respondents; Min.-minimum; Max.- maximum; AM- arithmetic mean; SD- standard deviation

Table 3 shows the regression analysis in which the predictor variables are personality traits, and the criterion variable are symptoms of anxiety and depression. Personality traits model explains 55.2% of variance in anxiety and depression, while neuroticism($\beta=677$, $p<0.01$), extraversion with a negative sign of the β coefficient ($\beta=-.155$, $p<0$) and positive valence ($\beta=.187$, $p<0.05$) stood out from the group of predictor variables.

Table 3. Personality traits as predictors of symptoms of anxiety and depression

	R	R ²	F	β	t	Sig.
Personality traits	.743	.552	22.574			.000
Neuroticism				.677	9.893	.000**
Extraversion				-.155	-2.052	.042*
Openness				-.066	-.870	.386
Conscientiousness				-.131	-1.810	.073
Aggressiveness				.062	.725	.470
Positive valence				.187	2.296	.023*
Negative valence				-.133	-1.628	.106

** $p<0.01$ * $p<0.05$

Source: Milutinovic & Pavicevic

Table 4 shows the regression analysis with personality traits as predictor variables, and traumatic symptoms as criterion. Personality traits as a model explained 39.8% of the variance of traumatic symptoms, and neuroticism ($\beta=555$, $p<0.01$) and positive valence ($\beta=.269$, $p<0.01$) stood out from the group of predictor variables.

Table 4. Personality traits as predictors of traumatic symptoms

	R	R ²	F	β	t	Sig.
Personality traits	.631	.398	12.100			.000
Neuroticism				.555	6.987	.000**
Extraversion				-.140	-1.599	.122
Openness				-.172	-1.955	.053
Conscientiousness				-.072	-.854	.395
Aggressiveness				-.038	-.386	.700
Positive valence				.269	2.845	.005**
Negative valence				.037	.387	.700

** $p<0.01$ * $p<0.05$

Source: Milutinovic & Pavicevic

Table 5 shows the regression analysis using personality traits as predictors, and somatic symptoms as criterion. Personality traits as a model explain 36.7% of the variance of somatic symptoms, and from the group of predictor variables, neuroticism ($\beta=511$, $p<0.01$), openness with a negative sign of the β coefficient ($\beta=-.329$, $p<0.05$) and positive valence ($\beta=.341$, $p<0.01$).

Table 5. Personality traits as predictors of somatic symptoms

Personality traits	R	R ²	F	β	t	Sig.
Personality traits	.606	.367	10.604			.000
Neuroticism				.511	6.278	.000**
Extraversion				-.040	-.445	.657
Openness				-.329	-3.654	.000**
Conscientiousness				-.089	-1.035	.302
Aggressiveness				-.044	-.431	.667
Positive valence				.341	3.515	.001**
Negative valence				.022	.225	.822

**p<0.01 *p<0.05

Source: Milutinovic & Pavicevic

Table 6 shows the regression analysis with personality traits as the predictor variables, and sexual difficulties as the criterion variable. Personality traits as a model explain 31% of the variance in sexual difficulties, and neuroticism ($\beta=331$, $p<0.01$), extraversion ($\beta=-.199$, $p<0.05$) and openness with a negative sign of the β coefficient ($\beta=-.298$, $p<0.01$) and positive valence ($\beta=.274$, $p<0.01$).

Table 6. Personality traits as predictors of sexual difficulties

Personality traits	R	R ²	F	β	t	Sig.
Personality traits	.557	.310	8.227			.000
Neuroticism				.331	3.891	.000**
Extraversion				-.199	-2.130	.035*
Openness				-.298	-3.166	.002**
Conscientiousness				-.102	-1.136	.258
Aggressiveness				-.130	-1.221	.224
Positive valence				.274	2.705	.008**
Negative valence				.183	1.800	.074

**p<0.01 *p<0.05

Source: Milutinovic & Pavicevic

4. DISCUSSION AND CONCLUSIONS

What gives dreams their strength and power is the accumulation and frequent repetition of experiences, which can lead to the development of psychological damage that affects the development of identity, personality development, and difficulties in controlling emotions. Trauma can also lead to destructive behaviour towards oneself and others, somatisation and a generally negative view of the world can occur (Profaca and Arambašić, 2009). People with high levels of neuroticism, introversion and narcissistic tendencies will show symptoms of anxiety, depression, and sexual difficulties. Pronounced neuroticism and narcissistic tendencies can lead to the appearance of traumatic symptoms. Pronounced neuroticism, introversion, rigid attitudes and narcissistic tendencies can also lead to the appearance of somatic symptoms. Pećnik (2006) points out that trauma has the most profound effects on cognitive and mental development, but also on the development and formation of personality. Certain forms of trauma are associated with lower self-esteem, a persistent sense of helplessness and a neurotic personality profile (Zloković and Dečman-Dobrnić, 2008). In contrast to people who have been physically abused and who have a characteristic neurotic personality profile, people who have been psychologically abused are more likely to be introverted and withdrawn. There is also evidence to suggest that people who have been psychologically abused are more likely to develop depression and low self-esteem than those who have been physically abused (Urbanz, 2000). One of the most severe forms of trauma is sexual abuse, which can have serious and lasting consequences such as nightmares, the development of phobias, sexual difficulties, depression, anxiety and low self-esteem (Bulatović, 2012). In previous research, traumatised people have been found to have anxiety and low self-esteem, which was not the case with non-traumatised people. Traumatised people also scored higher on the neuroticism scale, and they were more introverted and less emotionally stable than non-traumatised individuals. In this case, the presence of depression was not recorded in the traumatised individuals, but an increased risk of developing depression was recorded (Bunce, Larson & Peterson, 1995).

5. CONCLUSIONS

The results obtained lead us to conclude that the respondents are prone to negative affect, rigidity in attitudes and behaviour, narcissistic tendencies, and that as such they have not developed adequate strategies for dealing with the demands of a complex environment, so that they will perceive all new situations as threatening.

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ORGANIZATIONAL JUSTICE, JOB CHARACTERISTICS, AND ORGANIZATIONAL CLIMATE AS PREDICTORS OF EMPLOYEE ENGAGEMENT IN THE PRIVATE SECTOR

Emilija Popović^{1*}, Marija Savić², Jelena Davidović Rakić¹

¹University of Priština in Kosovska Mitrovica, Faculty of Philosophy, Department of Psychology, Serbia
e-mail: emapopovic.97@outlook.com, jelena.davidovic.rakic@pr.ac.rs

²Preschool facility "Dobrica", Kragujevac, Serbia, e-mail: maja.savic022@gmail.com



Abstract: The main goal of this research was to examine the contribution of organizational justice, job characteristics, and organizational climate in predicting work engagement among employees in the private sector. The instruments used in this study were the Utrecht Work Engagement Scale (UWES-9), Organizational Justice Scale (OJS), Job Characteristics Questionnaire (JCQ), and Quality of Interpersonal Relationships in the Team Scale (QIRT-S). The sample consisted of 203 participants employed in the private sector of the Republic of Serbia, including 62 male and 141 female participants, with ages ranging from 20 to 64 years ($M = 37.21$; $SD = 10.10$). The main objective of the research was tested using hierarchical regression analysis, where in the first model the predictors were socio-demographic variables, in the second model the dimensions of organizational justice were added, in the third model the dimensions of job characteristics were added, and in the fourth model organizational climate was added. The results of this analysis showed that the final model was statistically significant ($R^2 = 0.383$; $F(18,184) = 6.33$; $p = 0.000$), and that independent contributions to the prediction of work engagement were made by satisfaction with material rewards ($\beta = 0.246$), interpersonal justice ($\beta = 0.251$), informational justice ($\beta = 0.269$), cognitive job demands ($\beta = 0.166$), and organizational climate ($\beta = 0.165$). The findings reveal that satisfaction with material compensation significantly contributes to work engagement, with higher satisfaction linked to increased engagement. Cognitive job demands also play a crucial role, as more challenging tasks requiring higher cognitive resources lead to greater employee engagement. Perceived interactional justice, characterized by respectful treatment and timely, adequate communication from employers, is associated with higher work engagement. Additionally, a positive organizational climate is correlated with increased employee engagement. These results underscore the importance of material satisfaction, cognitive challenges, fair treatment, and a supportive work environment in enhancing employee engagement.

Keywords: work engagement, organizational justice, job characteristics, organizational climate.

Field: Social sciences

1. INTRODUCTION

Employee engagement is a crucial driver of organizational success, especially in the private sector where competitiveness and efficiency are key. High levels of employee engagement correlate with increased productivity, reduced turnover, and improved overall organizational performance. To effectively enhance employee engagement, it is essential to understand the roles of organizational justice, job characteristics, and organizational climate.

Organizational justice, encompassing distributive, procedural, interpersonal, and informational justice, profoundly influences employee perceptions of fairness within the workplace. Distributive justice refers to the perceived fairness of outcome distributions, procedural justice to the fairness of the processes that lead to outcomes, interpersonal justice to the fairness in treatment by supervisors, and informational justice to the fairness in the information provided (Colquitt et al., 2001). When employees perceive high levels of organizational justice, their trust in the organization increases, fostering greater commitment and engagement (Martins & Von der Ohe, 2003; Bakker & Demerouti, 2007). Empirical studies have shown that procedural justice is linked to job satisfaction and organizational commitment, both of which are critical components of engagement (Schaufeli et al., 2002). Furthermore, interpersonal and informational justice contribute to the emotional well-being of employees, enhancing their overall engagement (Greenberg, 1993). Job characteristics, as conceptualized by the Job Demands-Resources (JD-R) model, are pivotal in shaping employee engagement. This model posits that job resources, such as autonomy, social support, skill variety, task significance, and feedback, are essential for mitigating job demands and fostering work engagement (Bakker & Demerouti, 2008). Enriched job roles that provide these resources lead to intrinsic motivation, resulting in higher engagement levels. Schaufeli et al. (2002) found that job resources

*Corresponding author: emapopovic.97@outlook.com



not only help employees manage job demands but also play a motivational role by promoting personal growth, learning, and development. Additionally, jobs that offer autonomy and opportunities for skill development have been shown to enhance employee engagement by increasing their sense of control and competence (Sonnentag, 2003; Bakker & Demerouti, 2007). The organizational climate, defined as the shared perceptions of organizational policies, practices, and procedures, also significantly impacts employee engagement. A positive organizational climate characterized by support, recognition, trust, and open communication enhances employees' emotional and psychological attachment to their work (Schaufeli, 2013; Shuck & Wollard, 2010). Research indicates that a favorable organizational climate boosts engagement and leads to improved performance and reduced turnover intentions (Sonnentag, 2003; Maslach & Leiter, 1997). For example, a supportive climate facilitates recovery from job stress and encourages proactive behavior, leading to higher engagement levels (Sonnentag, 2003). Similarly, Maslach and Leiter (1997) highlight that a positive organizational climate reduces burnout and fosters engagement by creating an environment where employees feel valued and recognized. Recent studies have continued to underscore these points. For example, the work by Bakker and Demerouti (2019) elaborates on the JD-R model, emphasizing the dynamic interaction between job demands and resources in predicting work engagement. Furthermore, a study by Lee and Ok (2021) shows how perceptions of organizational justice directly influence engagement and job satisfaction, reinforcing the importance of fair treatment in the workplace. The integration of organizational justice, job characteristics, and organizational climate provides a comprehensive framework for understanding employee engagement. Implementing fair policies and procedures (organizational justice), designing enriching job roles (job characteristics), and fostering a supportive and positive work environment (organizational climate) collectively contribute to higher engagement levels. This holistic approach ensures that employees are not only satisfied with their jobs but also deeply engaged and committed to their organizational goals (Kahn, 1990; Bakker et al., 2008).

In summary, organizational justice, job characteristics, and organizational climate are crucial predictors of employee engagement. By fostering a fair and supportive work environment, designing motivating job roles, and cultivating a positive organizational climate, organizations can significantly enhance employee engagement, leading to improved performance, lower turnover, and greater organizational success (Colquitt et al., 2001; Martins & Von der Ohe, 2003; Schaufeli et al., 2002; Bakker & Demerouti, 2008; Schaufeli, 2013; Shuck & Wollard, 2010; Sonnentag, 2003; Maslach & Leiter, 1997; Kahn, 1990; Bakker et al., 2008; Bakker & Demerouti, 2019; Lee & Ok, 2021). This integrated approach not only enhances individual employee outcomes but also drives overall organizational success and sustainability.

2. MATERIALS AND METHODS

This study explores the relationships between organizational climate, organizational justice, job characteristics, and work engagement among private sector employees in Republic of Serbia, which are underexplored locally despite extensive Western research. Theoretically, it aims to enhance understanding of how these organizational factors influence work engagement, while practically, it provides insights for HR professionals and managers to develop strategies to improve employee engagement and productivity. The research objectives include determining how organizational justice, job characteristics, and organizational climate predict work engagement. The study utilized several validated instruments to measure key variables. The Utrecht Work Engagement Scale (UWES-9; Schaufeli et al., 2006; Popov, 2013) evaluates employee work engagement with nine statements on a 7-point Likert scale. The Organizational Justice Scale (OJS; Colquitt, 2001; Mirković, 2014) assesses perceptions of workplace fairness across four subdimensions: distributive, procedural, interpersonal, and informational justice, using twenty statements on a 5-point Likert scale. The Job Characteristics Questionnaire (JCQ; Popov, 2017) measures job demands through cognitive, emotional, quantitative, and physical dimensions using forty-six statements on a 5-point Likert scale. The Quality of Interpersonal Relationships in the Team Scale (QIRT-S; Szostek, 2019) examines the work environment with twenty-seven statements on a 7-point Likert scale. Additionally, a custom-developed Sociodemographic Questionnaire collected data on participants' demographic and job-related characteristics. The sample consisted of 203 private sector employees in Serbia, including 62 males and 141 females, aged 20-64 years (AM = 37.21; SD = 10.10), with varied job tenures and roles.

Table 1. Degree of reliability of the instruments used

	Number of items	A
Work engagement	9	0.91
(OJS) Distributive Justice	5	0.93
(OJS) Procedural Justice	5	0.89
(OJS) Interpersonal Justice	5	0.93
(OJS) Informational Justice	5	0.85
(UKP) Cognitive demands	3	0.60
(UKP) Emotional demands	3	0.64
(UKP) Quantitative demands	3	0.66
(UKP) Physical demands	3	0.86
Interpersonal Relationships in the team	58	0.98

Source: Popovic, Savic & Davidovic Rakić

3. RESULTS

In Table 2, the inter-variable correlations of the research variables are shown, and the results of the Pearson correlation coefficient indicate that the criterion variable, work engagement, significantly correlates with the predictor variables of distributive justice, procedural justice, interpersonal justice, informational justice, and organizational climate, and these correlations are positively oriented. The relationship between work engagement and other predictors, i.e., job characteristics, is lacking.

Table 2. Inter-variable correlation in research

Inter-variable correlation in research

	1	2	3	4	5	6	7	8	9
1. Work Engagement	-								
2. Distributive Justice	.26**	-							
3. Procedural Justice	.20**	.79**	-						
4. Interpersonal Justice	.43**	.37**	.46**	-					
5. Informational Justice	.41**	.52**	.64**	.65**	-				
6. Cognitive Job Demands	.09	-.16*	-.26**	-.16*	-.24**	-			
7. Emotional Job Demands	.01	-.35**	-.39**	-.22**	-.26**	.19**	-		
8. Quantitative Job Demands	-.10	-.08	-.11	-.23**	-.12	.38**	-.03	-	
9. Physical Job Demands	-.12	-.11	-.12	-.36**	-.23**	-.15*	-.07	.17*	-
10. Organizational Climate	.41**	.30**	.37**	.59**	.55**	-.03	-.13	-.20**	-.26**

*p<0,05 **p<0,01

Source: Popovic, Savic & Davidovic Rakić

In Table 3, a hierarchical regression analysis is shown to verify the main objective of this research, which is to determine the contribution of organizational justice, job characteristics, and organizational climate to the prediction of work engagement. The first model included sociodemographic variables (gender, age, tenure, satisfaction with material compensation, job type, and supervisory role), explaining 16.0% of the variance in work engagement, with age and satisfaction with material compensation positively contributing, while working with things negatively contributed. The second model added dimensions of organizational justice (distributive, procedural, interpersonal, informational), explaining 33.4% of the variance, with a significant increase of 17.4% from the first model. Positive predictors were satisfaction with material compensation, interpersonal justice, and informational justice, while negative predictors included working with things, working with data, and procedural justice. The third model added job characteristics (cognitive, emotional, quantitative, and physical demands), explaining 36.7% of the variance; however, the contribution of job characteristics was not statistically significant. Positive predictors were satisfaction with material compensation, interpersonal justice, informational justice, and cognitive job demands. The fourth model added organizational climate, explaining 38.3% of the variance, with a significant 1.5% increase from the third model. Positive predictors were satisfaction with material compensation, interpersonal justice, informational justice, cognitive job demands, and organizational climate.

Table 3. Prediction of work engagement

Prediction of work engagement					
Predictor		Model 1	Model 2	Model 3	Model 4
Gender	β	,002	,032	,003	,016
Age	β	,358*	,180	,194	,202
Work experience	β	-,314	-,030	-,057	-,065
Period of employment within the organization	β	,116	,018	,038	,041
Satisfaction with monetary compensation	β	,401*	,277*	,235*	,246*
Working with objects	β	-,157*	-,140*	-,156	-,141
Working with data	β	-,110	-,139*	-,115	-,119
Working with ideas	β	,053	,070	,062	,061
Manager	β	-,046	-,034	-,027	-,025
Distributive Justice	β		,100	,103	,106
Procedural Justice	β		-,238*	-,198	-,202
Interpersonal Justice	β		,284*	,311*	,251*
Informational Justice	β		,284*	,325*	,269*
Cognitive Job Demands	β			,196*	,166*
Emotional Job Demands	β			,023	,024
Quantitative Job Demands	β			-,068	-,043
Physical Job Demands	β			,145	,136
Organizational Climate	β				,165*
Model summary		$R^2=,160$	$R^2=,314$	$R^2=,367$	$R^2=,383$
		$F(9,193)=4,08$	$F(13,189)=7,30$	$F(17,195)=6,31$	$F(18,184)=6,33$
		$p=,000$	$p=,000$	$p=,000$	$p=,000$
Changes in model		/	$\Delta R^2=,174$	$\Delta R^2=,033$	$\Delta R^2=,015$
			$\Delta F(4,189)=12,38$	$\Delta F(4,185)=2,40$	$\Delta F(1,184)=4,60$
			$p=,000$	$p=,051$	$p=,033$

Source: Popovic, Savic & Davidovic Rakić

* - p value of the beta coefficient less than 0.05; β – beta standardized regression coefficient; R – multiple correlation coefficient; R2 – coefficient of multiple determination; F – F ratio; ΔR^2 - difference in the coefficient of multiple determination between models

4. DISCUSSION AND CONCLUSIONS

The study aimed to investigate the contribution of organizational justice, job characteristics, and organizational climate in predicting employee engagement in the private sector. Results partially confirmed the initial hypotheses, indicating that interpersonal and informational justice, job cognitive demands, and organizational climate explain a significant portion of variability in employee engagement (Sarid & Fried, 2009). Additionally, job satisfaction with material status was found to have a significant impact on employee engagement (Ancarani et al., 2019). Socioeconomic status was also identified as a complex factor influencing employee engagement, with higher status individuals showing more motivation and positive attitudes towards work (Klehe & Gash, 2018).

Furthermore, the study highlighted the importance of perceived organizational justice, job characteristics (specifically cognitive job demands), and organizational climate in explaining employee engagement. Positive organizational climate fosters autonomy, empowerment, and well-being, leading to increased job satisfaction, motivation, and engagement (Jyoti, 2013). Overall, these factors play crucial roles in predicting and enhancing employee engagement in the workplace.

When considering the obtained results, it is necessary to take into account the limitations of the study. Primarily, this research solely relied on self-assessment measures, raising concerns about potential biases in responses. Additionally, the limited demographic diversity of the participants, particularly fewer employees in managerial positions, reduces the generalizability of the findings. To enhance future research in this area, it is recommended to include a more diverse sample to improve result validity. Moreover, incorporating objective measures alongside self-assessments can provide a

more comprehensive understanding of employee engagement factors. Additionally, expanding the study to encompass a broader range of organizational settings and employee demographics would offer a more nuanced perspective on the topic.

Despite these limitations, the study suggests that organizational climate and justice can significantly impact employee engagement. By fostering a positive and inclusive environment, organizations can cultivate a sense of belonging and job satisfaction among employees. Ensuring fairness in decision-making processes and policies can further enhance trust and mutual respect within the organization. Employers can use incentives and rewards to encourage participation in activities that promote engagement, ultimately creating a more positive work environment. Organizations should focus on creating an environment that encourages engagement among all employees, regardless of their socio-demographic characteristics. Employers can also offer training programs, technical skills development, and flexible work options to enhance employee engagement and satisfaction.

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APPLICATION OF SPECIFIC METHODS IN ASSESSMENT AND DEVELOPMENT OF RATING SYSTEMS OF FINANCIAL INSTITUTIONS

Slobodan Šegrt^{1*}, Aca Randelović¹, Dejan Đurić²

¹Faculty of Business Studies and Law, University "Union - Nikola Tesla", Belgrade, Republic of Serbia,
e-mail: slobodan.segrt@fbsp.edu.rs, aca.randjelovic@fbsp.edu.rs,

²Ministry of Defense, Belgrade, Republic of Serbia, e-mail: djdejan76@gmail.com



Abstract: The rating system is an important factor in risk management and financial performance assessment. Until the beginning of the eighties of the last century, credit risk assessments of clients were carried out in a traditional way, which was mainly reduced to intuition and subjective assessment of internal rating by the management of financial institutions, while counting on their ability to make quality decisions based on knowledge and expertise. After that period, the global standardization of the rating system was carried out, which enabled an easier assessment and comparison of financial institutions. Activities related to evaluations and development of rating systems in financial institutions today must necessarily be an integral part of their ongoing operations and risk management culture, and it is also important that financial institutions are able to respond to the specific minimum requirements of the internal rating system, risk management process and capabilities assessments of their necessary components. For some risk exposure classes, the Basel Committee proposes a basic methodology by which financial institutions take their own risk assessment as an input, while assessments of additional risk factors are carried out through the application of standardized rules. At the same time as the basic methodology, advanced methodologies have been established that allow the use of one's own internal assessments of risk components. Wide use of such assessments is an important part of the dynamic and risk-sensitive IRB approach (Internal Rating Based) in such a way as to recognize and differentiate those financial institutions that are able to conduct a sufficiently valid and quantified risk assessment. Along with the standardization of these activities and the development of information systems, quantitative models are largely included in this type of analysis in order to improve the objectivity of predicting the probability of default (PD - Probability of Default) and expected losses. These models include financial indicators, macroeconomic conditions and historical data on loans and borrowers. Regression analysis, discriminant analysis, panel models, hazard models and neural networks are the most common and sophisticated techniques that can be used to assess the probability of debtor default. It can be concluded that, through the results obtained through the mentioned methods, the management of financial institutions can look more complexly and objectively at the real pictures of potential debtors, which in the end enables a better assessment of their default, and therefore the mentioned results of the analysis have a favorable effect on the development of the rating of financial institutions. It is recommended that when approaching this type of analysis, several techniques and methods mentioned above are simultaneously used and that the causes of the differences in the results are thoroughly analyzed, which in any case reduces the probability of the risk of non-payment.

Keywords: default probability, debtor, models, internal rating, regression analysis.

Field: Economy

1. INTRODUCTION

The financial system in general represents one of the most complex systems in society, which is accompanied by turbulence and the general dynamics of changes in market conditions. Optimum management of these systems is a big challenge nowadays. A huge number of internal and external factors affect their operations, so it is imperative for the management of financial institutions to identify them in time and to define the optimal strategy in the development of their rating system in accordance with them (Alastair L. 2022).

On external factors (market conditions and macroeconomic factors, general economic conditions, growth rates, unemployment rates, financial market conditions, interest rates, inflation, competition in the banking sector, availability of advanced technologies for modeling and data analysis, etc.), financial institutions do not have influences, they can only constantly adapt to them and improve their rating systems in order to survive, remain competitive and also comply with regulatory and market expectations.

Internal factors include factors within the financial institutions themselves that influence the development and effectiveness of their rating system. Management can and must influence these factors in order to minimize the negative effects on the level of business and profitability. Some of the key internal factors are: clearly defined roles and responsibilities in the process of determining the rating, effective procedures for validation and monitoring of ratings, skills and expertise of employees, competence of

*Corresponding author: slobodan.segrt@fbsp.edu.rs



credit analysts and personnel involved in the rating system, continuous education and improvement of skills, automation of processes and flows information, effective management and control, etc.

The goal of the management of financial institutions is to create conditions for the construction of the best possible rating system, which will be able to adapt to all challenges in their business, through adequate measures of internal control of business processes. Optimal management of a consistent and adequate policy in maintaining the rating system of financial institutions is also a prerequisite for their dominant positioning in this area of economic activity.

Due to the increasing complexity and complexity of numerous factors that can positively or negatively affect the rating system of financial institutions, it is imperative for financial management to use the most modern methods and techniques such as regression analysis, discriminant analysis, panel models, hazard models for the purpose of analyzing the aforementioned factors. , neural networks, etc., for better credit risk modeling and more precise determination of their rating, and less and less to rely on the subjective and experiential assessments of financial experts.

What represents the condition of all conditions in this area of analysis is the fact that, before approaching the complex assessment of the rating system of financial institutions through the mentioned techniques, it is necessary to assess the quality of the data and their sources, as well as the representativeness of the sample, bearing in mind that it is impossible to carry out the analysis in question on basis of data from the entire statistical set.

At the most developed financial institutions today, specific and advanced techniques in this type of analysis have become the standard in risk assessment, while at the same time further improvement of rating methodologies is continuously carried out (Matz L. 2017).

The development and improvement of the rating system enabled banks to better assess risks, comply with regulatory requirements and manage the credit portfolio more effectively.

The focus of the work will be on understanding the techniques that provide financial institutions with the opportunity to build adequate models of complex relationships between participants in the financial market in the most adequate way and more accurately predict possible risks in their operations.

2. MATERIALS AND METHODS

In this section, we will prioritize some specific quantitative techniques and methods that are most often used when evaluating and developing the rating system of financial institutions. (regression analysis, discriminant analysis, panel models, hazard models and neural networks)

Regression analysis: In statistical modeling, regression analysis is a tool used to determine the relationships between dependent or criterion variables and independent variables. In practice, for example, we may be interested in the dependence between employees' earnings and their education, as well as the connection between the level of national income per capita and their individual indebtedness. Observing the intensity and nature of those connections and dependencies is solved through the aforementioned regression model (Dowling E.T. 2017).

Regression analysis is one of the key techniques and methods used in determining the rating of financial institutions.

The basis of this type of analysis depends primarily on the objective identification of relevant indicators. In addition to the above, it is necessary to analyze historical data on changes in that data. In the end, it is important to choose those variables that have the most influence on non-fulfillment of obligations or the occurrence of default.

Using regression or other techniques, a model is formed that links the independent and dependent variables. This procedure evaluates the influence and importance of each independent variable individually on the dependent variables.

Statistical indicators of the accuracy of the model are analyzed, such as the coefficient of determination of the parameters and the standard error of their estimation. After that, the model is validated on independent samples, in order to evaluate its strength and objectivity.

A regression model is used to estimate the occurrence of default for each client based on its characteristics. The rating assignment is based on the ranking of clients according to the estimated default.

Model performance is regularly monitored through analysis of forecast accuracy, rating migration and default rates. The model is also periodically updated and adjusted to remain accurate and adequate.

Regression analysis provides an objective and statistically based approach to determining the rating, with the possibility of continuous improvement and adaptation to changes in credit risk. It is a key component of advanced rating systems of financial institutions (Engeimann & Rauhmeier, 2018).

A key advantage of regression models in financial institutions is their ability to analyze complex

relationships between variables and provide quantitative estimates that support informed business decision making.

Input characteristics, which are not relevant to the model, can seriously impair the quality and stability of the model when used to predict the credit risk associated with this data. It is preferable that the variables, which do not have a great influence on the results of the model, are simply ignored and thereby simplify the model, which in any case makes the work easier for persons performing regression analysis. However, the exclusion of some variables, regardless of their marginal importance for the research results, in any case contributes to a slight increase in the prediction error.

In financial institutions, regression analysis is most often used in the following cases: to assess the credit risk of clients, predict the level of deposits and loans, which helps them manage their balance sheet and liquidity-related risks, identify the most profitable customer segments and determine the most effective marketing channels and campaigns, discover suspicious transactions and patterns of behavior that may indicate fraud, determination of optimal interest rates and fees based on market conditions and risk profile of clients and to assess the credit, market and operational risk to which the financial institution is exposed (Greuning H. 2018).

Discriminant analysis is a sophisticated technique used in managing the rating system of financial institutions. It is used to classify clients and assign them to strata that depends on the calculated probability of default. The place where the client will be assigned depends on his individual characteristics regarding the mentioned probability of default of the debtor.

Discriminant analysis predicts the probability that the client will default. This probability is then used as the basis for assigning a credit rating. On the other hand, the accuracy of the classification of clients into rating groups, as well as the prediction of the probability of default are used to evaluate the quality of the discriminant analysis model. This evaluation is crucial for the validation and continuous improvement of the rating system.

Monitoring of rating changes helps financial institutions to respond in a timely manner to changes in the credit profile of clients. The combination of regression analysis and discriminant analysis forms a solid foundation and is the best way to accurately assess and monitor the risk of default.

The discriminant analysis is performed in a similar way as in the case of the regression model. In fact, the proportions between the coefficients of the regression model are equal to the corresponding proportions of the discriminant analysis. The difference between these two methods is theoretical: while in the regression model the characteristics have a deterministic nature, and the state of default is a random variable, in discriminant analysis it is quite the opposite, i.e. characteristics represent a random variable while the default state is deterministic. These differences are virtually unimportant in practice.

Panel models represent an advanced statistical technique used in modeling the credit rating of financial institutions. This technique has several key advantages over other methods.

Panel models use a combination of cross-sectional (different clients) and time series (data on clients over time). This makes it possible to look at more complex relationships and effects compared to models that use only cross-sections or only time series.

Panel models can remove or control for the influence of unobserved and time-invariant factors specific to each client. This improves the precision of the estimation of the effect of the observed variables on the probability of default.

Panel models can include dynamic elements, such as the dependence of ratings on previous ratings.

This enables better modeling of rating changes over time and provides financial institutions with the ability to develop sophisticated and accurate rating models based on the complex relationships and effects occurring in their portfolios of credit exposures (Brealey R. 2021).

The methods described so far are cross-sectional methods because all variables refer to the same time period. Financial institutions typically spread sets of variables over more than one period with each borrower. In this case, it is possible to extend cross-sectional data inputs to panel data sets.

In this way, we increase the number of available observations and also increase the stability and precision of the rating model. Panel models can also integrate macroeconomic variables.

Macroeconomic variables can improve the model for several reasons. Many sources of macroeconomic data are more up-to-date and more accessible than meso- and micro-level data, as data on macroeconomic variables are published by official national statistics. For example, financial ratios calculated on the basis of balance sheet information are usually updated annually and are no older than two years when we use them for risk assessment (Gitman L. 2019).

Oil prices, for example, are available to us according to the daily frequency of data, as well as prices of precious metals, stock prices on the stock exchanges, and the like change several times during

the day, and we can get that information.

Since macroeconomic variables primarily affect the absolute values of default probabilities, it is reasonable to incorporate macroeconomic imputations into these classes of models when estimating default probabilities.

Hazard models represent another advanced and sophisticated approach used in modeling credit ratings of financial institutions. These models focus on analyzing the time until the occurrence of a certain event, in this case default.

The hazard model analyzes the time until the client defaults. This allows banks to better understand the dynamics of credit risk changes over time. The model assesses the influence of various factors (financial indicators, macroeconomic factors, etc.) on the probability and speed of default. This helps banks identify the most significant drivers of credit risk.

Hazard models provide dynamic risk assessment, allowing the estimate of the probability of default to be updated over time. This is particularly useful for monitoring and managing a portfolio of credit exposures.

Hazard models generate survival and default rate curves, which show the probability that a client will not default by a certain time. These curves provide banks with important information for credit risk management.

Hazard models can include heterogeneity at the client level, such as industry specificity, location, etc. This enables a more individual and precise assessment of credit risk (Bessis J. 2019).

The models provide advanced capabilities for dynamic credit risk modeling and help financial institutions make better rating decisions.

All the models listed so far have tried to assess the riskiness of the borrower by estimating a certain type or score that would indicate whether or not the borrower is prone to default within a specific forecast horizon.

However, no exact prediction of default in time has been made. In addition, such approaches do not allow the evaluation of the debtor's risk in the future, which would not enter into default during a reference period of time.

These shortcomings can be overcome by using a hazard model, which explicitly handles the survival function and consequently the time at which we consider debt default.

Hazard models allow estimation of the survival function for all borrowers. The time period of historical data on default is the basis for assessing the debtor's survival and the probability of default in the following time period. These models indirectly estimate realistic assumptions about default in the future time period.

Neural networks represent sophisticated machine learning techniques that are increasingly used in modeling credit ratings of financial institutions.

Neural networks are used to estimate the probability of customer default. They can model complex and non-linear relationships between input parameters (financial data, macroeconomic factors, etc.) and output variables (customer default probabilities) (Bessis J. 2019).

Neural networks are applied to classify customers into different rating categories, such as low, medium or high probability of default. They learn to recognize patterns that determine belonging to rating categories.

Neural networks have the ability to continuously learn and adapt to changes in the credit portfolio and market conditions. This allows financial institutions to maintain the accuracy and relevance of the rating model.

Neural networks can detect non-linear and interactive patterns in data, which can be relevant to credit risk assessment. This overcomes the limitations of traditional statistical models.

Examples of neural networks used in bank rating systems include multilayer perceptrons, recurrent neural networks, and convolutional neural networks.

This advanced technology represents the future in credit risk modeling, providing powerful tools for accurate assessment and efficient portfolio management.

Neural networks are a type of computer system inspired by the structure and functions of biological neural networks in the brain.

The main components of neural networks are its network architecture, learning and non-linearity i.e. have the ability to model complex, non-linear relationships between inputs and outputs.

Neural networks are a powerful machine learning tool that can recognize and model complex relationships among data. They are intensively researched and widely used in modern IT and technology.

The application of neural networks in the financial sector is of great importance. Neural networks can analyze large amounts of transaction data to identify patterns of fraudulent activity, such as unusual spending behavior or suspicious transactions. This helps financial institutions detect and prevent fraud more

effectively. They can analyze credit history, income and other financial data to assess the creditworthiness of loan applicants. This helps financial institutions to make more accurate credit decisions based on the obtained data and to adapt their products and services to the needs of clients.

Neural networks can be used to analyze customer data, such as transaction histories and browsing patterns, to better understand customer behavior and preferences.

They can be used to automate and streamline the loan underwriting process by analyzing information about applicants and making more accurate loan approval decisions, and can also be trained on historical stock data to try to predict future stock price movements, which can be useful for investment and trading strategies.

Financial institutions are already making extensive use of neural network-based chatbots and virtual assistants to provide personalized customer service and support, answer questions, and assist with tasks.

Key benefits of using neural networks in banking include improved accuracy, speed and scalability in areas such as risk assessment, fraud detection and customer insight. This helps creditors make better decisions and provide better service to their clients.

In previous years, neural networks have been intensively discussed as alternatives to statistical models.

The characteristics of a neural network easily model highly complex, non-linear relationships between inputs and outputs. These models can be quickly adapted to new information inputs (depending on the training or training algorithm). There are no formal procedures that would determine the optimum and type of network for connecting the layers and nodes connecting the input and output variables. Neural networks are black boxes because they are very difficult to interpret. Using this method, calculating the probability of default is only possible up to certain limits with considerable additional effort. They are partially suitable when there are no expectations (based on experience or on theoretical arguments) (Samuels J. 2016).

3. RESULTS

The application of advanced techniques in the modeling of banks' rating systems has brought a number of significant results that improve the efficiency and precision of credit risk management.

Regression-based analyses, both linear and logistic, have proven to be a powerful tool for identifying key determinants of the probability of default (PD) of financial institution clients. These models enabled banks to quantify the impact of various financial indicators, macroeconomic and other factors on credit risk assessment. The results of regression analyzes provide banks with a deeper understanding of the drivers of credit risk in their portfolios.

The application of discriminant analysis in bank rating systems has demonstrated its ability to effectively classify clients into different rating categories. This technique generated discriminant functions that maximize the differences between groups of clients with different credit profiles. The identification of key parameters that best describe groups of clients allowed banks to focus credit risk assessment on the most relevant areas.

The introduction of panel models in the rating systems of banks brought a significant improvement compared to standard regression approaches. These models used a combination of cross-sectional and time-series data, allowing banks to control for the influence of unobserved and constant factors specific to each customer.

The results of the panel models provided financial institutions with information for a deeper understanding of the dynamic effects that influence changes in credit ratings over time.

The implementation of the hazard model in rating systems focused on the analysis of the time until default. These models generated survival and default rate curves, providing financial institutions with key information about the probability that a customer will default at different time intervals. This has improved the ability of financial institutions to dynamically monitor and manage the credit risk of their portfolios.

The adoption of neural networks in financial institution rating systems has brought advances in automation, adaptability, and detection of complex nonlinear patterns in credit risk data. Neural networks enable the automation of the process of credit risk assessment and rating assignment.

Neural networks have demonstrated the ability to accurately predict default probabilities and reliably classify clients into rating categories. This advanced machine learning technique has enabled banks to improve their rating processes and maintain model relevance in a dynamic environment.

The simultaneous application of these methods ensures a continuous and efficient rating system in financial institutions. In this way, they have the possibility to make more realistic assessments and approximation of the risk of default and take adequate measures in order to optimize the use of capital as

well as its allocation to the most profitable jobs.

4. DISCUSSIONS

The application of advanced statistical techniques represents a key step in improving the rating system of financial institutions and their efficiency in credit risk assessment and management. Compared to traditional approaches based on the subjective assessment of credit officers, statistical methods provide a more objective and dynamic basis for assigning credit ratings.

Regression analysis, either linear or logistic, allows banks to identify the most significant determinants of default probability and quantify their impact. This gives banks a better understanding of the key factors driving their customers' credit risk.

On the other hand, discriminant analysis provides an advanced technique for classifying clients into different rating categories. The mentioned method generates discriminant functions that maximize the differences between groups of clients with different credit profiles. This enables financial institutions to identify the most relevant factors for differentiating the risk profiles of clients.

Panel models represent a sophisticated extension of the regression technique, taking into account panel data that contain cross-sections and time series. This provides the ability to control for the influence of unobserved, time-invariant factors specific to each client, as well as to model the dynamic effects of rating changes over time.

Hazard models, on the other hand, focus on analyzing the time to default. They provide financial experts with important information about the dynamics of credit risk, including survival rates and default probabilities over different time intervals. This enables more precise portfolio management and making better business decisions.

The latest trends in the financial market also recognize the potential of applying neural networks in rating systems. This advanced machine learning technique enables the discovery of complex and non-linear patterns in data, which overcomes the limitations of traditional statistical methods. Neural networks can automate credit risk assessment and rating processes, with the ability to continuously adapt to changes.

The common feature of these methods and techniques is that they enable financial institutions to assess, monitor and manage credit risk in an objective and quantitatively based way. This results in accurate rating systems that comply with the regulatory framework and provide bankers with a competitive edge in the market.

However, the application of these advanced methods requires appropriate knowledge, high quality data and continuous monitoring of their performance. Financial institutions must therefore invest in the development of expertise, the construction of complex and reliable information systems, as well as a quality management structure in order to fully utilize the potential of the approach in question in determining the credit rating.

5. CONCLUSION

The application of advanced and specific methods in determining the rating system of financial institutions is a key factor for improving the quality, precision and efficiency of their operations. Due to the increasing complexity and complexity of relations between participants in the financial market, the traditional approach based on the subjective assessment of the rating system is increasingly giving way to sophisticated techniques such as regression analysis, discriminant analysis, panel models, hazard models and neural networks.

These methods allow banks to better understand and model the complex relationships between different determinants of credit risk. They provide a more objective and dynamic assessment of the probability of default, which is key information for assigning adequate credit ratings.

Additionally, these approaches provide the ability to continuously monitor and update the rating model, as well as assess the quality and consistency of the entire rating system. This achieves compliance with regulatory requirements and improves credit portfolio management.

By moving to advanced and sophisticated techniques, financial institutions can improve their ability to assess and predict credit risk, make better lending decisions and allocate capital more efficiently. This represents a key competitive advantage in a dynamic financial environment.

Therefore, the continuous improvement of the rating system using the methods mentioned in the paper is a strategic priority area for financial institutions that want to improve their credit risk management performance and maintain a competitive advantage in the market.

Financial institutions are required to have a sophisticated system of assessing the accuracy and consistency of the rating system, process, and internal monitoring of risk factors. Historical time frames for the data used in assessing the degree of data correlation should be as long as possible and ideally cover the entire business cycle.

The relevant analyzes must also identify future changes in economic conditions and possible events that could adversely affect default assessments and therefore the overall level of capital adequacy.

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EXPLORING SCIENCE EDUCATION THROUGH TOYS AND HANDS-ON ACTIVITIES: PARTICIPANT INSIGHTS

Dee Jean Ong¹, Nathaphon Boonnam^{2*}, Eng Tek Ong³, Janchai Yingprayoon⁴

¹HELP University, Malaysia, e-mail: deejean.o@help.edu.my

²Faculty of Science and Industrial Technology, Prince of Songkhla University, Thailand,
e-mail: nathaphon.b@psu.ac.th

³UCSI University, Malaysia, e-mail: OngET@ucsiuniversity.edu.my

⁴Faculty of Science and Industrial Technology, Prince of Songkla University Surat Thani Campus, Thailand,
e-mail: janchai.y@psuwitsurat.ac.th



Abstract: A two-day international ICASE workshop on exploring science education through toys and hands-on activities was held in a demonstration school in Southern Province, Thailand. The workshop objectives were to 1) create awareness of the use of toys and hands-on activities to teach science education and 2) to expose the students to the science toys and hands-on activities in learning science in the classroom. Amongst the 168 international and local delegates who participated in the workshop, we only focused on the 132 secondary students (aged 13 to 18) from the demonstration school as our study participants. A four open-ended questionnaire was administered to the study participants the week after the conference to gauge the students' feedback on the international ICASE workshop. A total of 113 completed and returned the questionnaires (85% response rate). Findings revealed that students responded positively towards the ICASE international workshop. The participants enjoyed the science show, science toys, cock fighting games, Mr. Wolf and Food UNO card games. Based on the positive feedback, future international workshops in science education can be organized to further expose and encourage the students to learn science through toys and hands-on activities.

Keywords: interactive science toys, hands-on activities, science workshop

Field: Education

1. INTRODUCTION

Science teaching should be interactive, enjoyable, and hands-on. Several studies in Turkey have presented similar results. Teachers who teach science in a fun and playful manner may spark students' interest in the subject (Bulunuz, 2012a, 2012b; Jarret, 1998, 1999). Teacher's empathy and classroom climate may significantly impact students' attitudes towards the subject (Miljenovic, Travar & Opsenica, 2024). When students are free to play and experiment with materials, they show curiosity, creativity, and initiative (Jarret & Jafri, 2019). Students who received play-oriented science instruction outperformed those who got textbook instruction in terms of science test scores (Jarret & Jafri, 2019). Hands-on activities in the classroom have been shown to have a positive motivational effect while teaching science in both the USA and Turkey, according to studies (Bulunuz & Jarrett, 2015). According to one study done in a 7th grade elementary school, 96% of students who participated in fun, hands-on science (SCIIS) took up more science courses in middle school, while just 4% of students who only learned science from textbooks did so (Sprague & Wolf, 1983). While doing hands-on activities such as games, students learn a wide range of social skills like sharing, negotiation, strategizing and taking turns (DeVries, 2016).

Teaching science with toys can be highly motivating for teachers as well as the students (Jarrett et al., 2020). In 2013, the Secondary Science Department of the Institute for the Promotion of Teaching Science and Technology (IPST) tested the Science of Toys textbook with a group of teachers and students in the 7th to 9th grades in the secondary schools in Thailand. Findings from the study indicated that both teachers and students liked the content, learning activities and teaching approach with science toys. Students reported that learning science with toys was engaging and had helped them better understand the scientific concepts (Jarret & Jafri, 2019; Thananuwong, 2015). Toys are tools of play and have meaning across the life space (Erikson, 1997) and culture (Sutto-Smith, 1986). A study conducted in Nigeria suggested that traditional Igbo games and play activities helped students learn basic scientific concepts and process skills (Okeke, 1984). Students also displayed positive scientific behaviour such as curiosity, critical reflection and objectivity (Okeke, 1984). As the students learn through play, they can also engage in measurement and scientific or engineering design (Jarret et al., 2020).

As students develop concepts through play, play can foster a lifelong interest in science education

*Corresponding author: deejean.o@help.edu.my



(Bulunuz & Jarrett, 2015; Csikszentmihalyi & Bennet, 1097; Jarrett & Jafri, 2019; Onder, 2018). Findings in the Games Project in the USA reported games had effectively fulfilled the instructional goals and simultaneously piqued students' interest in learning science (Lowe, 1988). Games give students the same opportunity to learn about their own cultures as traditional scientific toys do. Students may be able to arrange meaningful learning experiences through games and activities (DeVries & Edwards, 1973). As a result, toys, games, and activities have value for teachers as well.

2. MATERIALS AND METHODS

A two-day international ICASE (International Council of Associations for Science Education) workshop on teaching science using toys and hands-on activities was held in a demonstration school in Southern Province, Thailand. The international ICASE workshop has two objectives: 1) to create awareness of the use of toys and hands-on activities to teach science education and 2) to expose the students to the teaching of science education using toys and hands-on activities. Our research study was guided by two research questions:

1) What is the participants' feedback on the international ICASE workshop on teaching science using toys and hands-on activities?

2) What can be inferred from the participants' feedback on the international ICASE workshop on teaching science using toys and hands-on activities?

We limited our study to 132 secondary students (ages 13 to 18) from the demonstration school out of the 168 local and international delegates who attended the workshop. Secondary school students from the Southern Province of Thailand's demonstration school participated in the study. Mathayom is the name of the secondary division in Thai schools. Students in grades 13 through 15 attended Mathayom 1 through 3. Students ages 16 to 18 who are enrolled in Mathayom 4–6 make up the higher secondary school. For the students in Mathayom 5 (M5), attendance was required. For the Mathayom 1 (M1), Mathayom 2 (M2), and Mathayom 4 (M4) students, it was optional. There are currently no Mathayom 3 (M3) pupils enrolled in the school.

Through official email, the organizer invited science education specialists from Thailand, Malaysia, Taiwan, and India. Four science teachers from secondary schools and a STEM coordinator from several regions in Thailand were among the other workshop presenters. Additionally, three groups of secondary school students from Thai schools in the southern provinces gave presentations of their work. A leaflet outlining the goal, time, location, and expense was sent by email by the organizer to the schools. After responding via email or the official LINE of the organizer, interested parties were given a presentation time and notified of their allocation. We excluded delegates not from the demonstration school (n = 36) from the 168 participants since we were primarily interested in only the students (n = 132) who attended the demonstration school in the Southern Province. Since there were fewer than five participants in the study, M2 students were not included.

3. RESULTS

Descriptive analysis was used to analyze the data.

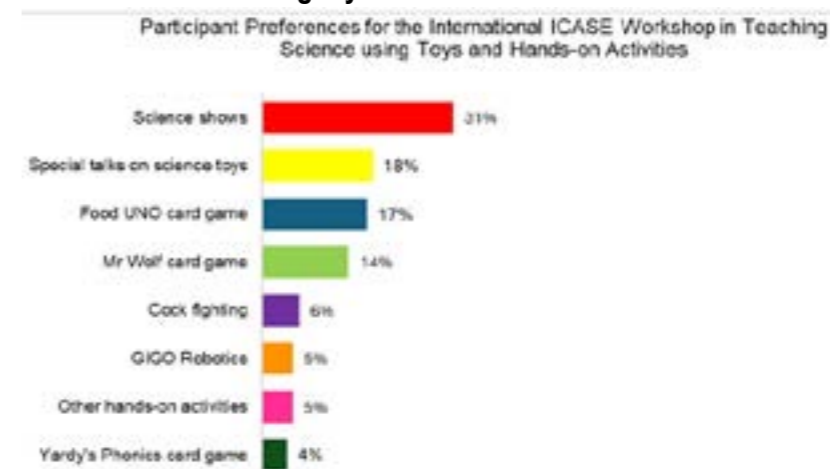
Table 1. Number of participants, respondents and response rate for the ICASE Conference

	Participants (n)	Number of responses (n)	Respond rate (%)
M1	34	34	100
M4	40	35	81
M5	58	44	76
Total	132	113	

Source: Ong, *Thongprasoong*, Ong (2024)

A total of 113 participants completed and returned the questionnaires, representing an 85% response rate (Table 1). Approximately half of the respondents (n = 58, 44%) (M5 students) attended the conference as presenters, while 74 (56%) attended voluntarily. Amongst the M4 and M5 participants, 13 (10%) served as student helpers. Two students role-played as the masters of ceremony and workshop facilitators while other students acted as photographers and also workshop facilitators. Over the 2-day duration of the international ICASE workshop, 121 (91.6%) respondents attended 85-90% of all the sessions on the first day. 80 (60%) respondents attended 70-80% of the sessions on the second day, and 64 respondents attended more than 40% of the sessions.

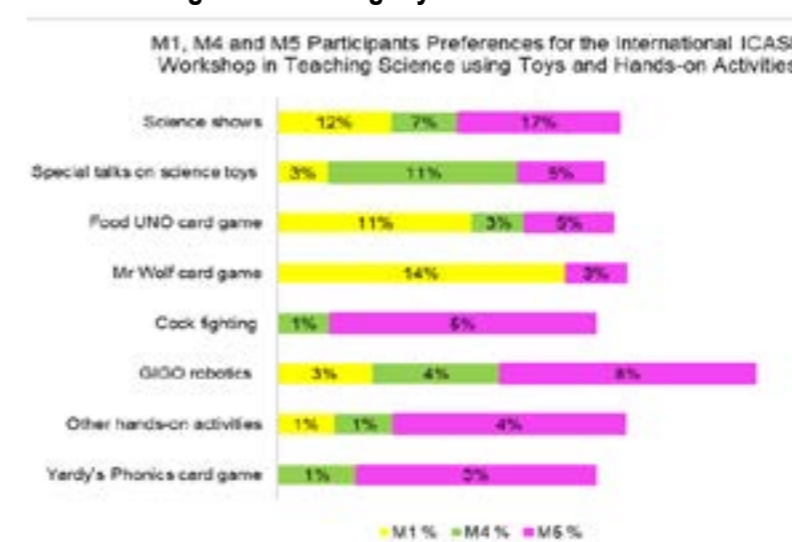
Fig.1. Participants' preferences for the international ICASE workshop in teaching science using toys and hands-on activities



Source: The authors

Figure 1 represents participant preferences for the international ICASE workshops in teaching science using toys and hands-on activities. 31% (n = 43) favoured the science shows. Participant preferences for the special talks on science toys, Food UNO and Mr. Wolf card games were somewhat similar with 18% (n = 23), 17% (n = 22) and 14% (n = 18) respectively. Participant preferences for the other workshops were somewhat evenly distributed amongst the cock fighting workshops (n = 8, 6%), GIGO robotics (n = 7, 7%), other hands-on activities (n = 7, 7%) and Yardy's Phonics card game (n = 5, 4%).

Fig. 2. M1, M4 and M5 participants' preferences for the international ICASE workshop in teaching science using toys and hands-on activities



Source: The authors

Figure 2 shows the breakdown of M1, M4 and M5 participants' preferences for the workshops they liked best at the international ICASE workshop in teaching science using toys and hands-on activities. M5 participants favoured the science shows (17%) and GIGO robots (8%), with their least favourite activities being the cards games (Food UNO card game, 5%; Mr Wolf card game, 3% and Yardy's phonics card game, 3%). In contrast, the M1 students enjoyed the Food UNO (11%) and Mr Wolf card games (14%) very much. M4 participants preferred the special talks on science toys the most (11%).

Table 2. Respondents' workshop preferences and their preference reasons

Workshops	Reasons	M1	M4	M5	Total
		Number of respondents (%)			
Science shows	It was fun.	10(33.3)	10(33.3)	12(40)	30(56.6)
53	Learnt physics principles.	10(43.5)	4(17.4)	9(39.1)	23(43.4)
Special talks on science toys	Learnt new science principles.	12(30.7)	17(43.6)	10(25.7)	39(59)
66	Learnt about science toys.	10(37)	11(40.7)	6(22.3)	27(41)
Food UNO card game	It was fun.	12(46.3)	6(23)	8(30.7)	26(59)
44	Learnt new vocabulary.	3(37.5)	4(50)	1(12.5)	8(18.3)
	Made new friends.	3(60)	1(20)	1(20)	5(11.3)
	Learnt to strategize how to win.	2(66.6)	1(33.4)	0(0)	3(6.8)
	Loved to play card games.	0(0)	1(50)	1(50)	2(4.6)
Mr. Wolf card game	It was fun.	11(57.9)	6(31.6)	2(10.5)	19(48.7)
39	Learnt to tell the time.	1(14.3)	5(71.4)	1(14.3)	7(18)
	Taught others to tell the time.	0(0)	3(75)	1(25)	4(10.3)
	Made new friends.	3(42.9)	3(42.9)	1(14.2)	7(18)
	Learnt to strategize to win.	0(0)	1(50)	1(50)	2(5)
Cock fighting	It was fun.	4(20)	6(30)	10(50)	20(86.9)
23	Learnt physics principles.	0(0)	0(0)	2(100)	2(8.7)
	Was my childhood game.	0(0)	0(0)	1(100)	1(4.4)
GIGO robotics	It was fun.	1(8.3)	4(33.3)	7(58.4)	12(60)
20	Used my imagination to make a toy.	0(0)	5(62.5)	3(37.5)	8(40)
Other hands-on activities	It was fun.	5(35.7)	2(14.3)	7(50)	14(53.8)
26	Learnt to make simple experiments.	2(22.3)	4(44.4)	3(33.3)	9(34.6)
	Learnt physics principles.	0(0)	0(0)	5(100)	5(19.2)
Yardy's Phonics card game	Learnt new vocabulary.	1(9)	4(36.5)	6(54.5)	11(55)
20	Learnt to practice phonics.	1(11.1)	3(33.3)	5(55.5)	9(45)

Source: The authors

Table 2 shows respondents' workshop preferences and their preference reasons. The respondents liked the special talks on science toys best because they could learn new science principles and science toys (n = 66, 59%). They also enjoyed the science shows very much because they were fun (n = 53, 56.6%), and they could learn physics principles (n = 23, 43.4%). A vast majority of the respondents (n = 44, 59%) agreed that the Food UNO card game was the most enjoyable as it was fun; they could learn new vocabulary, strategize and make new friends. Most respondents (n = 39, 48.7%) liked the Mr. Wolf card game since it was fun. They could also learn to tell the time and teach others to tell it in English. In addition, they learnt to strategize to win the game and made new friends. Meanwhile, almost half of the respondents (n = 23) agreed that cock fighting and other hands-on activities (n = 20) were fun. They could learn to make simple experiments and also learn physics principles. As for GIGO robotics and Yardy's phonics card game, the same number of respondents (n = 20) agreed that it was fun; they could use their imagination to make a toy, learn new vocabulary and practice phonics.

4. DISCUSSIONS

According to our research, the international ICASE workshop on teaching science through toys and interactive activities was well-received by the attendees. However, we did find some variations in the choices and preferences of the M1, M4, and M5 respondents. First, M4 and M5 respondents expressed more satisfaction with the science exhibitions and special discussions on science toys, compared to the gaming workshops. This result suggests that respondents from upper secondary schools are more knowledge-oriented since they are eager to learn about novel ideas in physics and science. Some M1 respondents gave specific explanations for why they preferred science shows and in-depth discussions on science toys, just like the M4 and M5 respondents did. This result is in line with studies that show teaching methods affect students' interest in the science (Bulunuz, 2012a, 2012b; Jarret, 1998, 1999). These findings have real-world applications; in addition to being enjoyable, teachers should help students better understand science concepts and ideas. Developing teachers' professional skills in science education is crucial (Radiojevic & Gavric, 2023; Tancic & Dermanov, 2023). For future international ICASE workshop, science teachers can create basic scientific worksheets and booklets. In the classroom following the worldwide ICASE workshop, teachers can further explain and mentor students on the pertinent subjects.

Second, lower secondary respondents (M1) were more attracted to game-oriented workshops. Similar findings were observed where younger students showed interest in learning science when

they were permitted to play and experiment (Bulunuz, 2012a, 2012b; Jarrett, 1998, 1999; Ong, & et al., 2020; Ong, Aslam & Amjad, 2024). In this regard, classroom science lessons should offer students more opportunities to play and engage with the materials (Jarret & Jafri, 2019; Atanasova, 2024). Our study found that younger M1 respondents preferred card games, whereas older M4 and M5 respondents favored hands-on science activities. This suggests a preference among younger students for learning science through enjoyable card games, while older students gravitated towards games and science toys reminiscent of their childhood activities. As previously reported (DeVries & Edwards, 1973), traditional games and science toys can evoke cultural memories. Additionally, M4 and M5 respondents preferred constructive hands-on science activities similar to findings in recent studies that found students can learn through play while engaging in measurement and scientific or engineering design (Jarret et al., 2020).

The study's limitations include its single-site focus on participants from one demonstration school, excluding others from different schools and provinces. A multi-site study is needed to improve the generalizability of the findings. Additionally, not accounting for respondent demographics such as age, gender, science knowledge, background, and interest in science may limit the depth and accuracy of feedback. Furthermore, the exclusion of teacher respondents prevents valuable insights into the international ICASE workshop on teaching science through toys and hands-on activities. Future research should incorporate surveys and interviews with teachers to enrich understanding of participant experiences.

5. CONCLUSIONS

Participants had positive experiences with the international ICASE workshop on teaching science using toys and hands-on activities. Students became motivated to learn science. They wanted to know more about the science activities and science toys from different parts of the world. It is suggested that more international ICASE workshops should be considered to further expose the participants to the trends, teaching and learning of science.

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CONTRIBUTION TO THE STUDY OF EDUCATION DURING CLASSICAL ANTIQUITY USING EXAMPLES FROM THE SOUTH OF THE PROVINCE OF DALMATIA

*Gligor M. Samardžić**

¹Faculty of Philosophy, University of Priština in Kosovska Mitrovica, Serbia
email: gligor.samardzic@pr.ac.rs; gligorijas@yahoo.com



Abstract: Education is one of the most important factors in the development of humans. During classical antiquity, a relatively modest importance was attributed to education. It was present in the society of classical antiquity; it began in Ancient Greece and continued in the Roman period. Education in classical antiquity was part of philosophical and other studies about the state and social organization. Ancient philosophy set the foundation for different social concepts that have been developing until today. Education strongly influenced society, although it was mostly accessible to only the richest layer of society. The paper will present the education development course during classical antiquity, relying on the persons who addressed this issue. Through selected examples, we will show how this process was perceived by prominent Greek thinkers who followed society's attitude towards education. Thoughts about education were associated with thoughts about the state, governance, and the best polity. Moreover, we will cover examples from the south of the province of Dalmatia (the monument with an inscription from Prčanj, writing styluses made of different materials from Panik near Bileća, Mogorjelo, and Višić near Čapljina, Naron, etc.). The analysis of discovered monuments and archaeological materials from the above locations suggests that education was important in the south of Dalmatia. These facts will show us whether the citizens in the south of the province of Dalmatia, during classical antiquity, used writing in everyday life, which required education. Moreover, the aforementioned written and material testimonies will suggest how this process took place in the south of the province of Dalmatia. We will also analyze the sources and literature from classical antiquity and compare them with current knowledge and achievements regarding education to come to a valid conclusion.

Keywords: education, classical antiquity, Greece, Rome, province of Dalmatia.

Field: Social sciences

1. INTRODUCTION

The first reflections on the relationship between upbringing, education, and society can be found among ancient Greek philosophers, from the sophists, Plato and Aristotle, to the post-Aristotelian schools (Stoics, Epicureans). Discussing the best way of organizing the state, Plato and Aristotle believed that the state should be ruled by philosophers, people who have devoted a large part of their lives to upbringing, education, and self-improvement. At the same time, Aristotle paid special attention to the morality of rulers. "It happens elsewhere that the state is democratic according to the laws, but the administration is oligarchic due to its education and morals." We should not neglect that Plato and Aristotle, as well as other Greek philosophers of the time, believed that upbringing and education were not for slaves (Aristotel, 2003, pgs. 121–128).

As we can see, society's stance towards upbringing and education is as old as the thought about society and its organization. Thoughts and different views of upbringing and education in society, in ancient Greek philosophy, were presented in a fragmented, unsystematic, and contextual manner. This is the result of a lack of education in the system. Sophistic teachings introduced us to the perception of social relations created by people as their lack of freedom. Plato's Republic suggests that it is about imitating Egyptian society in the form of an idealization of the ancient social class. Plato's wish to stop the decline of Athenian society led him to find a model of harmonious functioning of various strata of society so that everyone would be happy. He shared a thought about the structure of society, the division of labor in which education occupied an important place. He noted conflicts between social classes and tried to provide a solution for them. Additionally, his works emphasize the importance of demographic and geographical factors in society, religion, and education (Aristotel, 2003, pgs. 121–128). Aristotle, Plato's pupil, took some ideas from his teacher. Like Plato, he saw that happiness, moral perfection, and justice are achieved through the harmonization of the interests of individuals in the state. To achieve this, the state must be ideal, and Aristotle offered examples of ideal forms of government in his Politics. An example

*Corresponding author: gligor.samardzic@pr.ac.rs



from his biography illustrates the relationship between politics and education. After teaching Alexander the Great, Aristotle returned to Athens and founded his school Lyceum teaching several scientific disciplines he founded, including politics as a practical science. After 13 years of work, it was declared an espionage institution, and Aristotle was accused. He left Athens with the explanation that he did not want Athens to make a second mistake regarding philosophy, alluding to the trial of Socrates. This best illustrates how education can have a strong influence on society, and that the repression of progressive thought is not something that happened recently (Fiamengo, 1973, pg. 17; Kolarić, 1998, pg. 77).

Two thousand years have passed since the world of classical antiquity. Despite the large period, sometimes we understand that distant world better than the modern one. Today, we certainly have more technical knowledge, but probably fewer ideas. We are often troubled by the same problems as the ancient Greeks and Romans as they are permanent. Today, they have different forms but the content is the same (Spektorski, 1997, pg. 31). Let us start by observing a portrait of a married couple from 79 BC. An example of Pompeian painting is the so-called house of Terentius Neo. The husband and wife were painted with the personal characteristics of the society to which they belong: these are neither a sword, spear, arrow, wealth, nor power, these are: a book, writing table, and stylus. These are personal tools that they used, so this cultural ideal is natural for us. Familiarity was rarely depicted in classical art. The husband is represented with his chin resting on the upper part of the book (in the form of a scroll) as if he is waiting for something. The wife thoughtfully raised the stylus to her lips, searching for the words for a verse. This is not a question of daydreaming. They are confident in themselves, (their ideas) which is proof of their closeness to the culture. There are no signs of privilege, they keep the book and the accessories because they love them. The harmony and genuineness of education make up the greatness of the Greco-Roman world that we are exploring (Тас. Ann. XIV 1–13, 57, 62, 64; Аријес-Дибби, 2000, pgs. 13–15).

2. ANALYSIS AND CRITICISM OF SOURCE MATERIALS

In Greece, literacy was never a kind of special knowledge only mastered by experts. The ability of the Greeks in the 5th century BC to read and write was implied. We do not know exactly how widespread literacy was. Writing was used in poetry, public speaking, voting, writing tombstones, making shopping lists, and even swearing at opponents. An illiterate person in Greece was considered uncultured. Women in Greece were not encouraged to study and write, although many of them did. Likewise, it is believed that in Athens, more than half of the male population knew how to read and write. A high literacy rate indicates a widespread school system. Greek culture was characterized by oral forms and means of communication that preceded written ones (Harvey, 1966, pgs. 583–635; Musić, 1942, pgs. 52–53). The Athenians had gymnasiums and palestras, but the state had no public schools, so education was private. Professional teachers personally organized private schools, and children of free citizens attended classes (Busuladžić, 2018, pgs. 11). Data about organized schools originate from the 6th century BC. Education and teachers were paid, but it was not expensive. Athenian laws prescribed the working hours of the schools as well as the number and age of the boys who attended them. State supervision of teachers was also organized for the moral protection of children. For families who could afford it, a slave accompanied children to school. Schooling started at the age of 7 and usually lasted 3 to 4 years, as long as it took to master the basic skills. After education, the boys focused on physical fitness and military discipline, followed by drawing and painting (Busuladžić, 2018, pg. 11). The next stage of life started at the age of 18, so it is assumed that many persons spent 10 years of schooling. Education was traditionally divided into three areas (literature, physical education, and music), under the supervision of three teachers (Harvey, 1966, pgs. 583–635; Кенеди, 2019, pgs. 90–92). Unlike boys, girls were homeschooled. Their mother and nanny taught them reading, writing, arithmetic, and household chores (Djurant, 1996, pgs. 311–313; Busuladžić, 2018, pg. 11). Following the Greco-Persian wars, in addition to mathematics, reading, writing, and music, there was an increase in the number of subjects taught to young Greeks, such as rhetoric, tactics, and other disciplines taught by sophists. Although some girls went to grammar schools, the study of rhetoric was, almost exclusively, the privilege of young men. The rhetor introduced the students at school to the theory of rhetoric. The students were asked to use their knowledge of this subject in practice by speaking in front of the whole class (meietē in the Hellenic school, and declamatio in the Latin school). (Quintus I 39–117, II 121–179, VIII 221–262, IX 281–336, X 369–420, XI 429–452, XII 489–543; Musić, 1942, pgs. 52–53; Busuladžić, 2018, pg. 11; Кенеди, 2019, pgs. 37–70, 91–92; Brković / Bušljeta-Kardum, 2021, pgs. 113–124; Jovanović, 2022, pgs. 3–24).

Literature implied learning how to read and write, grammar and language, memorizing verses (Homer) as well as addressing questions of poets. Teachers expressed their social status by imposing

strict discipline through corporal punishment. The educational practice of the Greeks predicted that poets were the most useful moral teachers, while prose writers and technical subjects were not studied. Physical education was carried out in wrestling schools (palaistra). The training was led by teachers who insisted on individual physical exercises or sports. Various physical exercises were performed, where under the supervision of the teacher, the students learned different types of fights, swimming, and more. The music included choir singing and playing instruments. In the music school, students learned to sing and play various instruments and dance to music. It is believed that upbringing and education in classical Athens were available, not only to citizens of aristocratic origin but also to wider layers of the population. At the end of the 4th century BC, the system of Athens stipulated that all young men 18 years old should spend 2 years in the gymnasium and military training under the supervision of special officials and teachers. This institution, ephēbeia, in the Hellenistic period became a symbol of the city and a way of distinguishing the citizens from the non-citizens (Harvey, 1966, pgs. 583–635).

In his *Politics*, Aristotle explained what the system of upbringing and education of youth in Greece consisted of: "There are two periods of education: between the ages of seven to puberty and puberty to twenty-one". According to him, education has the task of completing the deficiencies of nature. Likewise, he stated that human life should be divided into a period of 7 years because this division keeps pace with nature. When it comes to education, he pointed out that: "There are perhaps four customary subjects of education: Reading and writing, gymnastics, music, and sometimes drawing. Reading and writing and drawing being taught as being useful for the purposes of life and very serviceable, and gymnastics as contributing to manly courage... Music is not as useful as gymnastics for health and strength, because neither health nor physical strength is gained through music." Aristotle did not only provide simple explanations of why gymnastics is necessary for the youth, but he also used examples to portray everything more vividly. Thus he wrote: "It is therefore agreed that we should employ gymnastic training, and how we should employ it. For until puberty we should apply lighter exercises, forbidding hard diet and severe exertions, in order that nothing may hinder the growth. For there is no small proof that it can produce this result: in the list of Olympic victors, one would only find two or three persons who have won both as men and as boys, because when people go into training in youth the severe exercises rob them of their strength. But when they have spent three years after puberty upon their other studies, then it is suitable to occupy the next period of life with laborious exercises and strict training diet. For it is wrong to work hard with the mind and the body at the same time; for it is the nature of the two different sorts of exertion to produce opposite effects, bodily toil impeding the development of the mind and mental toil that of the body." (Aristotel, 2003, pgs. 215–232; Иоанидис / Стефановић / Кариоту / Шилъак / Мијатовић, 2008, pgs. 66–74; Momčinović, 2021, pgs. 2–14).

At the beginning of the 5th century BC, in Athens, there was a form of higher education that prepared young men for participation in public life. The rise of Athens caused all the famous lecturers to come to this city. Traveling lecturers amazed with their knowledge of many subjects (anthropology, mathematics, linguistics), announcements, and intelligence. Their visits are reflected in the works of Plato. In these works, he set up an antithesis between the sophists and Socrates. They stated that they possessed all knowledge and that he knew nothing; they flaunted their speaking skills, he only asked a question; they offered to teach people how to be better, he just pointed out man's ignorance, etc. The influence of the sophists on the aristocratic youth of the 5th century BC was immense. A generation of politicians appeared who opposed the plebeian attitudes of demagogues. The sophistic educational system developed in two directions with the help of Plato and Isocrates (Harvey, 1966, pgs. 583–635; Кенеди, 2019, pgs. 37–70). Plato attempted to create leaders for a new philosophical age and to systematically study the various branches of philosophy, from mathematics to metaphysics. Isocrates channeled the sophistic movement in the direction of continuous professional training. Rhetoric was turned into a skill suitable for occasions when something had to be formulated verbally, but there was nothing in his theories to encourage serious thought. The turmoil between Plato and Isocrates created the theories of logic and rhetoric, which we find in Aristotle (Harvey, 1966, pgs. 583–635; Кенеди, 2019, pgs. 37–70). The contrast between philosophy and rhetoric as two forms of mental activity that prevailed until the end of classical antiquity developed from Aristotle. Along with the transition from traveling sophists to schools of philosophy and rhetoric, the medical profession was also progressing. This process can be traced through medical experiments attributed to Hippocrates of Kos. It is a great achievement that medicine survived in a world where belief was believed to be more effective. The Hippocratic Oath contains the principles of this new medicine as well as the way it was organized (Harvey, 1966, pgs. 583–635).

In the 5th century BC, the sophists introduced secondary education. As professors and pedagogues, they thought about the virtues that make a noble man successful. Sophists had no permanent school. They were travelers who traveled and trained young people. They taught rhetoric, made plans, taught how

to come up with ideas, how to impress judges, and discuss justice and injustice. Later, many philosophers opened schools in Athens teaching their philosophical concepts. Isocrates founded the school of rhetoric in the 4th century BC, teaching the art of speaking. He considered rhetoric to be an art and scorned sophists who approached oratory technically. The result was few illiterates in Athens at the end of the 5th century, because education became available to all social classes (Quintus I 39–117, II 121–179; Битен, 2010, pgs. 225–228; Knezović, 2019, pgs. 5–14).

An example of a professor pedagogue as a traveler who traveled and taught virtues can be found in the south of the province of Dalmatia (today a monument with an inscription from Prčanj). Namely, this monument was discovered in Risan, but it was moved and built into a brick wall behind the apse of the Church of the Nativity of the Blessed Virgin Mary in Prčanj (Bogorodični hram) by its pastor, the famous historian and collector of antiquities, don Niko Luković. The inscription was engraved on an irregularly edged white marble slab measuring 28 x 29 cm. The size of the letters in the rows is not equal. The first three rows are larger and the last four are smaller. The inscription reads: ΔΥΟΝΙΣΙΟΥΣ / ΕΙΡΗΝΑΙΟΥ ΙΑ/ΣΕΥΣ ΡΗΤΟΡ / ΕΥΔΑΙΜΟΝΗΣΑΣ ΕΤΕΛΕΥ/ΤΑΕΤΩΝ ΟΔΜΘ / ΕΠΟΙΕΙ ΕΠΙΚΤΗΣΙΣ ΑΠΕΛΕΥ/ΘΕΡΑ. Διονύσιος / Ειρηναίου Ια- / σεΐς ῥήτωρ, / εὐδαιμονήσας ἑτελεύ- / 5 τα ἐτῶν οδ´, μ(ην)θ´ / ἔποιε ἐπίκτησις ἑτελεύ- / θέρα. Inscriptions in the Greek language are less represented among the archaeological material from the south of the province of Dalmatia. The inscription of Dionysius, the son of Irenaeus from the city of Iasos in Caria, is extremely significant because it is the only inscription in the south of the province of Dalmatia that mentions a rhetor. Based on the inscription, we can conclude that he died at the age of 74 and nine months on a journey, or that he lived and worked in the south of the province of Dalmatia as a teacher of rhetoric, and that the freedwoman Epiktēs erected this monument in his honor. It is believed that the reason for his journey far away from home in Caria was to teach young people the art of rhetoric (field research, 2023/2024, manuscript Martinović, pg. 56).

Roman upbringing and education were based both on its own experiences and on the experiences of other nations (Busuladžić, 2018, pg. 10). Before upbringing and education, a newborn baby that came into the world was accepted into society (tolere) or exposed (in front of the door or at the dump), according to the decision of the chief of the house. In 1 BC, a Hellenian wrote to his wife "If, knock on wood, you have a child, let him live if it's a boy; expose him if it's female" (Tac. Ann. XIV 1–13, 57, 62, 64; Аријес-Диби, 2000, pgs. 13–15). Seneca informed us that the Romans strangled or exposed crippled children. "We need to separate what is good from what is useless." Some of the causes of child abandonment were poverty, infidelity, distribution of inheritance, and political-religious manifestation. The last connotation was particularly indicative. For example, after Agrippina was murdered by her son Nero, a stranger exposed the child with the announcement "I am not raising you for fear that you will slaughter your mother" (Tac. Ann. XIV 1–13, 57, 62, 64; Аријес-Диби, 2000, pgs. 13–15). We can see that the first forms of upbringing and education in Rome were based on homeschooling. In this earliest period, the father had a decisive influence (pater familias). During family upbringing and education, children were taught religion, writing, reading, and the basics of the law, as well as the Greek language in some families (as its importance grew) (Giunio, 2016, pg. 27; Busuladžić, 2018, pg. 12).

Apart from the mother, who fed, brought up, and educated the child, a significant role until puberty was played by the nurser and the pedagogue (nutritor, tropheus), who, among other things, was responsible for good upbringing. From early childhood, children were brought up to participate in family (household) chores. Mother had an important role in the educational process of a child until the age of seven (for girls it was even longer), and later the role was assumed by the father (especially for boys). In addition to household chores and farming, children learned prayers and acquired and built the most important virtues (moderation, seriousness, courage, persistence, piety, the cult of ancestors, etc.) (Hosni / Ninčević, 2017, pgs. 43–61). One example shows us the importance of pedagogues. Namely, Marcus Aurelius was taught by a pedagogue to take care of himself. As soon as he passed the age at which children are left to the care of a nanny, he was entrusted to learned people. He spoke with great respect about his birth father, his adoptive father, and his "foster carer". Children lived and dined with their guardians, but they dined ceremoniously with their parents (Царска повест, 2009, I 10; II 7; III 9). For a long time, Emperor Claudius was under the supervision and guidance of educators and pedagogues, whom he hated because of the frequent abuse of the whip (Suetonius, 195, pgs. 193–220). Nero had an accomplice and helper, his "foster carer" for the murder of his mother Agrippina. When the rebels were chasing him to his death, only his nurser comforted him. After committing suicide, his nannies Egloge and Alexandria buried him with his lover Acte (Suetonius, 195, pgs. 221–254). The future emperor Vespasian was raised and educated under the supervision of his paternal grandmother, on the estate at Cosa, in the small village of Falacrine, above Reate, although his mother was still alive (Suetonius, 195, pg. 288). Caesar and Augustus were raised similarly (Suetonius, 195, pg. 288).

In Rome, morality was thought to consist less of love and the habit of virtue, and more of the strength to resist vice. This would mean that the strength of resistance is a condition for the balance of personality. Upbringing in the Empire was aimed at toughening the character so that when a child grows up, they will become resistant to luxury and various vices. Parents influenced infants so that their personalities tolerated everything that was for their good because they continued to carry the family name and honor. The frequency of adoption of children in the Empire suggests how unnatural the Roman family was. Apart from having children in a valid marriage, adoption was also a means of preventing the discontinuation of the family line. Adopted children were usually not pampered and coddled. Their care was left to servants, that is, to a nurser who was usually Greek so that the child could learn the cultural language. The pedagogue had the duty to teach the child to read (Аријес-Диби, 2000, pgs. 21–23).

A certain number of young Romans went to school until the age of 12 (girls and boys). Schools in Rome were mixed. Boys from wealthier families continued their education after the age of 12. Whereas some girls would get a tutor or would get married after the age of 12 because in any case girls were considered adults at the age of 14. The belief that the Roman school had the function of shaping a personality and adapting them to society is considered wrong. In Rome, subjects that contributed to this were not studied, but those that brought prestige (rhetoric) (Аријес-Диби, 2000, pgs. 23–26; Кенеди, 2019, pgs. 111–126). The Roman school is considered to have been imported, so it was separated from the street, politics, and religious activity. Unlike the Roman school, the Greek school was part of public life. Literature, rhetoric, philosophy, and music were taught on training and fighting grounds. Sports made up half of the learning time, which lasted until the age of 16. A Roman person from a distinguished house could be considered educated if they were taught the Greek language and literature by a private tutor. However, Greek intellectuals did not care about learning the Latin language. Only those Greeks who wanted to pursue a legal career in the administration would begin to learn Latin towards the end of Antiquity (Аријес-Диби, 2000, pgs. 23–26). The school was a means of appropriating and reshaping culture. She taught every respectable Roman citizen activities that were generally useful and that few were interested in. The school taught and called classical only what was most convenient for teaching. Rhetoric turned into a pre-prepared lecture. This is essentially not something that benefited society because school and school exercises became a means unto itself (Аријес-Диби, 2000, pgs. 23–26; Кенеди, 2019, pgs. 111–126).

In the south of the province of Dalmatia, a significant number of styluses were found indicating the existence of education within the homes of parents of children of a younger age, who acquired their first knowledge and skills of writing, reading, and arithmetic. From the south of the province of Dalmatia, significant objects that can be defined as writing utensils (styluses) were found in the sites of Narona, Višić, and Mogorjelo near Čapljina and Panik near Bileća. The material analysis indicates that the bronze and iron examples of styluses from the mentioned sites are the most common (field research, 2023/2024, Busuladžić, 2028, pg. 19).

3. CONCLUSION

Different social, economic, and technological conditions have influenced upbringing and education throughout history. During classical antiquity, upbringing and education were treated within philosophical and other teachings about the state and social organization. Classical philosophy provided the basis for different concepts of society that continue to develop until today. Even at this period, upbringing and education exerted a strong influence on society, although it was mostly available only to the richest class. The widespread use of letters and the services of scribes means that part of the rich literature and mythology of peoples of classical antiquity is constantly being discovered today. It is considered that the Greek period of upbringing and education was more significant than the Roman one because philosophers in this period were focused on description and morality, which they discussed within the framework of law. According to Fiamengo, "Apart from the elaboration of the legal phenomenon, the Romans did not make any significant contribution to the development of sociological thought".

By studying sources (narrative, epigraphic monuments) and literature from the period of classical antiquity and comparing them with today's knowledge in the field of upbringing and education, we came to the following conclusion: in classical antiquity, as well as today, upbringing and education included: nurser (nanny, guardian), pedagogue, teacher, specialist trainers, people from the field of sports medicine, scientists, and others. The working principle from the period of classical antiquity has remained quite similar until today. They knew the principles of work and training. In the past, preparation for work and training was sketched, but today we use computer technology for planning and programming. Music was especially used during training and competition as motivation for achieving success/results in the chosen sports activity. A similar thing happens today in the process of sports training and competition. Recovery

received great attention in both periods. In ancient Greece, coaching science existed at the corresponding level of knowledge, just as it exists today in terms of the new technology of sports training. The use of terminology, selection of athletes, categories of competitors, versatile preparation, the use of optimal load during training, knowledge of periodization (microcycle), nutrition, and others, combines former and present knowledge about sports training, i.e., two sports cultures from different periods.

In essence, education and upbringing in Greece was a combination of physical, mental, moral, and intellectual training, which aimed to mold young people by the traditions and the greatest models of Greek society. This influenced the development of scientific thought, the outlines of which are present to this day. For the person of classical antiquity, the knowledge of reading and writing was less important than conversation, discussion, and theater, which represented far more important sources of knowledge. The children did not go to school to get a certificate and acquire all educational qualifications. Children were sent to school for upbringing and education, to acquire good morals, behavior, and physical composition not only for personal or family interest but also for the interest of the wider community in which they lived.

Physical education was the first and basic level of upbringing and education among the Romans. Unlike the Greeks, who emphasized physical appearance (vigorous exercises, training, sports competitions), the Romans associated physical education with military readiness (learning various skills, strengthening character, getting around in different situations, gymnastic exercises, etc.). The higher level of upbringing and education among the Romans included the school of medicine, grammar, literature, rhetoric, and others. Further Roman upbringing and education included public readings and libraries. In such circumstances, private as well as public book readings were organized, and attended by those interested in readings by authors or learned people.

Research results led to the realization that the evidence found in the south of the province of Dalmatia (a monument with an inscription from Prčanj, writing styluses made of different materials from the area of Panik near Bileća, Mogorjelo, and Višić near Čapljina, Naron, etc.) indicate that upbringing and education were important in this area in classical antiquity. The significant number of discovered styluses indicates that the population in the south of the province of Dalmatia used writing in everyday life, meaning that they were educated. Archaeological field research indicates that this process was quite developed in the south of the province of Dalmatia during the period of the Empire, as evidenced by epigraphic monuments and finds from the mentioned sites.

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HUMAN CAPITAL DYNAMICS: A CATALYST FOR BANK PROFITABILITY IN EMERGING MARKETS – A CASE STUDY OF SERBIA

Goran Pavlović¹, Miloš Stojanović¹, Jasmina Gligorijević², Bojan Petrović³, Miodrag Šmelcerović²

¹ Metropolitan University, Serbia, goran.pavlovic@metropolitan.ac.rs, milos.stojanovic@metropolitan.ac.rs

² University Business Academy in Novi Sad, Serbia, jasmina.gligorijevic@fpm.rs, mshmelcerovic@yahoo.com

³ Faculty of Law, Megatrend University, Serbia, bojan.petrovic@megatrend.edu.rs



Abstract: Human capital emerges as a crucial determinant of banks' profitability, particularly in the context of developing economies. Through strategic investments in the specific skills and competencies of employees, banks cultivate a distinct body of tacit knowledge exclusive to their workforce. This tacit knowledge contributes to long-term profitability and establishes a sustainable competitive advantage. This paper aims to investigate the impact of human capital on bank profitability within the dynamics of a developing economy. The research focuses on the banking sector of the Republic of Serbia, covering the time span from 2020 to 2023. The independent variable in this study is human capital, assessed using the VAIC methodology and operationalized through the Human Capital Efficiency (HCE) coefficient. Meanwhile, bank profitability serves as the dependent variable and is operationalized through Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM). The research employs descriptive statistics, normality tests, as well as correlation and regression analyses. The findings demonstrate a statistically significant and positive correlation between human capital and ROA, ROE, and NPM, validating all research hypotheses. This substantiates the assertion that investing in the human capital of bank employees is synonymous with investing in the institution's most crucial asset, ensuring sustained profitability and a competitive advantage. Furthermore, such investments facilitate increased productivity among employees, fostering optimal resource utilization, continuous learning, the development of new knowledge, and effective resolution of complex problems. The significance of this research lies in its comprehensive elucidation of the importance and role of human capital, as a component of intellectual capital, in shaping bank profitability. Future studies could enhance this understanding by incorporating data on human capital and bank profitability from other developed economies, enabling a comparative analysis to glean insights for further improving human capital strategies. Additionally, an extension of the analysis to encompass a more extended time frame and the utilization of advanced statistical techniques like Structural Equation Modeling (SEM) and panel regression would contribute to a more nuanced understanding of the relationship.

Keywords: human capital, bank profitability, bank performance, competitiveness

Field: Business economics

1. INTRODUCTION

Traditional economic paradigms typically revolve around development driven by tangible assets like land, capital, and machinery. However, in the contemporary landscape of a knowledge-based economy, the emphasis shifts towards intangible resources, particularly those of significant value, such as intellectual capital (Tran & Vo, 2020; Onumah & Duho, 2020). Within the realm of intellectual resources, it is unequivocal that human capital stands out as the paramount factor influencing economic development, encapsulating the unique and valuable knowledge acquired by individuals through formal education and their career (Rahman & Akhter, 2021). Human capital emerges as a pivotal determinant contributing to variations in the productivity levels of national economies (Deming, 2022). Recognized as a critical national resource, human capital yields a positive impact on innovation and productivity, solidifying its status as a cornerstone in driving economic progress (Tran & Vo, 2020a). This reservoir of knowledge, experience, and abilities is initially acquired through formal education and further enriched via practical experience and ongoing training throughout an individual's career trajectory (Slavković & Ognjanović, 2018). Embedded within the intellectual capital framework, human capital encompasses elements such as intelligence, tacit knowledge, a predisposition for continuous learning, and adaptability through additional training (Veselinović, Krsić & Veselinović, 2021). Due to its nature as an intrinsic resource tied to individuals, human capital becomes an integral part of intangible assets that are not easily replicable or interchangeable. This uniqueness underscores its positive impact on establishing sustainable competitive advantages (Buallay, Hamdan, Reyad, Badawi & Madbouly, 2019). Given its status as an integral component of a company's intangible and intellectual property, human capital often serves as a decisive factor influencing profitability. This influence is particularly pronounced in its impact on performances

Corresponding author: goran.pavlovic@metropolitan.ac.rs



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like net profit, Return on Assets (ROA), and Return on Equity (ROE) in the context of the banking sector (Soevarno & Tjahjadi, 2020; Peković, Pavlović & Zdravković, 2020; Pavlović, 2023; Githaiga, 2022).

The banking sector plays a pivotal role in fostering economic development by facilitating a robust financial system, fostering the growth of the capital market, and serving as an efficient channel for credit activities (Dogan & Yildiz, 2023). Given its status as a knowledge-based industry, it is indisputable that human capital stands out as a key determinant influencing the profitability and competitive advantage achieved by banks (Mirza, Hasnaoui, Naqvi & Rizvi, 2020). The financial system of Serbia has a bank-centric character (Pavlović, 2023). Significant economic changes occurred precisely with the parallel growth and development of the banking sector (Paunović, Dimić & Arsenijević, 2019). As highlighted by Đuričin & Lončar (2020), various macroeconomic variables indicate that the Republic of Serbia's economy currently holds a favorable position compared to earlier periods. Simply put, the Republic of Serbia has evolved into one of the developing economies, as evidenced by the average GDP growth rate reaching 3.6% by the end of 2023 (Statistical office of the Republic of Serbia, 2024).

Banks' human capital is developed through the synergistic effect of formal education, professional development and accumulated years of hands-on experience within the banking sector (Liu, Liu & Zhang, 2021). The competencies of bank employees tend to exhibit a higher degree of homogeneity compared to other sectors, fostering a notable level of expertise that significantly shapes the outcomes of the banks' operations (Tran & Vo, 2020). Key profitability indicators such as ROA, ROE, and net profit emerge as the most prevalent metrics for assessing banks' achievements, providing a direct reflection of their earning capacity (Dogan & Yildiz, 2023). Examining intellectual capital and its impact on banks in Vietnam, Tran & Vo (2020) underscore the pivotal role of intellectual capital as a determining factor of the profitability of financial institutions in developing economies, with human capital standing out as the most influential contributor. Similarly, in a study conducted in the banking sector of Bangladesh, Rahman & Akhter (2021) identified a positive correlation between human capital and bank performance. Further, a study in Vietnam spanning the years 2007 to 2019, conducted by Le & Nguyen (2020), highlighted the positive influence of intellectual capital (measured through the VAIC methodology) and human capital on the returns realized by banks. On the African continent, Onumah & Duho (2020) conducted an analysis of intellectual capital's impact on bank returns in Ghana, covering a timeframe from 2000 to 2015. The study, encompassing 32 banks, established a positive correlation between intellectual capital and profitability. Notably, the study underscored the paramount importance of human capital in contributing to these positive outcomes.

Duho (2020) points out that banks in developing economies should focus on investing in human capital, as these economies eventually become knowledge-based economies, where human capital represents central factor of competitive advantage. In a similar vein, Li et al. (2020) assert that in these evolving landscapes, all facets of intellectual capital exert a decisive influence on business success and development. However, human capital stands out as the most critical element, primarily due to its profound impact on employee productivity. While research on the influence of intellectual capital on banks' profitability exists in the Republic of Serbia (Bontis, Janošević & Dženopoljac, 2013; Peković, Pavlović & Zdravković, 2020), studies exclusively focused on the impact of human capital on profitability are scarce. Pavlović (2023) delved into the relationship between human capital and achieved performance, albeit within the specific context of the COVID-19 pandemic's effects on the fluctuation of human capital value and its subsequent repercussions on the financial results of banks. Recognizing the dearth of research specifically addressing the influence of human capital on profitability within the banking sector, and drawing insights from studies highlighting such influence in developing economies, the following hypotheses can be formulated.:

- H1: Human capital has a statistically significant and positive impact on banks' ROA.
- H2: Human capital has a statistically significant and positive impact on banks' ROE.
- H3: Human capital achieves a statistically significant and positive impact on NPM of banks.

2. MATERIALS AND METHODS

To test the formulated hypotheses, a comprehensive study was conducted to examine the impact of human capital on the profitability of banks in the Republic of Serbia. The research encompassed all banks operating within the country, with the analysis period spanning from 2020 to 2023. It is noteworthy that the data utilized for the year 2023 extends to the third quarter, given the absence of officially published financial reports on the achieved results for the entire year. During the initial phase of the study (2020-2022), the research population consisted of 22 banks. However, changes in the banking landscape during 2023 led to the integration of certain banks, resulting in a refined research population of 20 banks operating in the Republic of Serbia for this period. The independent variable in this study is human capital, while bank

profitability serves as the dependent variable, gauged through metrics such as ROA, ROE, and NPM. Human capital was quantified using the VAIC methodology (Value Added Intellectual Capital Coefficient). In this approach, the first step involves determining the value added, computed as the difference between income and realized investments. Notably, investments in employees are treated as a distinct category, necessitating the deduction of employee wages from total costs. Once the value added is calculated, it is then placed against the investments made in employees, typically observed through wages, resulting in the derivation of the Human Capital Coefficient (HCE) (Pulić, 2000). The research operationalizes ROA as the ratio of net profit after tax to total assets, while ROE is calculated as the ratio of net profit to invested capital. NPM, on the other hand, is defined as the ratio of net profit to realized revenues. This approach ensures a comprehensive evaluation of the intricate interplay between human capital and the profitability metrics of the banks in the Republic of Serbia.

3. RESULTS

At the beginning of the statistical analysis, descriptive statistics were applied, the results of which are presented in Table 1.

Table 1. Descriptive statistics

Variables	Min	Max	Mean	Standard deviation
HCE	-1.72	6.91	1.3494	1.82605
ROA	-3.99	6.34	0.6870	1.58116
ROE	-9.46	69.09	13.1125	16.48392
NPM	-171.51	253.27	14.8431	49.75591

Source: Authors

By observing the results of descriptive statistics, it is evident that all variables exhibit a positive average value. Specifically, the HCE attains an average value of 1.3494, accompanied by a relatively low standard deviation of 1.82605. The analyzed banks demonstrate a ROA of 0.6870, coupled with a ROE of 13.1125. Notably, the NPM is 14.8431, featuring a relatively high standard deviation. It becomes apparent that within the population, certain banks have experienced both notably low and exceptionally high levels of net profit over time, contributing to the observed high standard deviation. Prior to delving into the correlation analysis, it is imperative to assess the distribution of the data. This involves conducting the Kolmogorov-Smirnov and Shapiro-Wilk tests, with the detailed data presented in Table 2.

Table 2. Normality tests

Variables	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
HCE	0.140	106	0.000	0.929	106	0.000
ROA	0.197	106	0.000	0.911	106	0.000
ROE	0.115	106	0.001	0.867	106	0.000
NPM	0.253	106	0.000	0.776	106	0.000

Source: Authors

Since the Kolmogorov-Smirnov and Shapiro-Wilk tests for all variables achieve a statistically significant result ($p < 0.05$), it can be argued that the data do not follow a normal distribution, which implies non-parametric tests. The results of Spearman's correlation are presented in Table 3.

Table 3. Correlation analysis

Variables	HCE	ROA	ROE	NPM
HCE	1	0.729**	0.702**	0.763**
ROA	0.729**	1	0.905**	0.917
ROE	0.702**	0.905**	1	0.907**
NPM	0.763**	0.917**	0.907**	1

Note: Correlation is significant at the 0.01 level (2-tailed).

Source: Authors

Analyzing exclusively the relationship between the independent variable and the dependent variables, it is observed that the correlation is the highest between HCE and NPM (0.763). As a correlation

greater than +/-0.5 can be considered high (Cohen, 1988), it can be concluded that there is a high direct correlation between HCE and NPM, but also HCE on the one hand, and ROA and ROE on the other. Table 4 shows the results of the regression analysis.

Table 4. Regression analysis

Model	R2 -	β	t	Sig.	Durbin Watson	VIF
HCE→ROA	0.434	0.659	8,935	0.000	2.026	1,000
HCE→ROE	0.551	0.742	11,292	0.000	2.041	1,000
HCE→NPM	0.347	0.589	7,439	0.000	2.199	1,000

Source: Authors

The results of the regression analysis show a statistically significant and positive impact of HCE on ROA, ROE and NPM. Human capital explains 43.4% of ROA variability, 55.1% of ROE variability and 34.7% of NPM variability. The results of the Durbin Watson test in the case of the impact of HCE on ROA and HCE on ROE are slightly above 2, which indicates the absence of autocorrelation (Bontis et al, 2013). However, it is noticeable that the result of the Durbin Watson test in the case of the impact of HCE on NPM is 2.199, which is slightly more than 2, and which shows the relative presence of autorelation, so this result of the regression analysis has a lower degree of reliability than others. In all regression models, the VIF factor is less than 5, which shows that there is no presence of multicollinearity (Field, 2000).

4. DISCUSSIONS

Based on the findings of the research, human capital emerges as a pivotal determinant influencing the profitability of banks. The study reveals a statistically significant and positive impact of human capital on ROA, ROE, and NPM, thereby confirming the hypotheses H1, H2, and H3, respectively. These results align with analogous studies conducted in developing economies, reinforcing the consensus that human capital exerts a positive effect on bank profitability (Le & Nguyen, 2020; Duho, 2020; Tran & Vo, 2020; Rahman & Akhter, 2021). The potential transformation of developing economies into knowledge-based economies hinges on sustained investments in human capital. Knowledge, acquired through education and continuous learning initiatives, stands out as a decisive factor shaping the success and competitive advantage of national economies. In this transformative process, banks play a pivotal role by fostering an efficient healthcare system. Consequently, bank managers bear a crucial responsibility in facilitating the acquisition of essential knowledge by employees, thereby unlocking the potential for long-term success and sustainable competitive advantage. Given the inherent homogeneity of human capital within the banking sector compared to other industries, employees develop specialized skills and expertise tailored to address specific challenges, resulting in a positive impact on productivity. The collaborative learning environment, knowledge sharing, and the cultivation of tacit knowledge contribute to the formation of human capital unique to each bank's workforce. The research demonstrates an initial positive impact on ROA, followed by ROE, underscoring the justifiable consideration of human capital as the most crucial form of assets and capital at a bank's disposal. Unlike other tangible forms of capital, human capital is intangible, valuable, and rare, making it resistant to easy appropriation by competitors. Investments in such intangible assets and forms of capital translate into high rates of return, positively influencing profitability. Examining the relationship between human capital and the mentioned variables, a significant influence on the variability of profitability indicators is evident, particularly in the case of ROE. This reinforces the notion that human capital stands as a distinctive and special form of capital accessible to banks. Decisions by bank management to invest in employees' competencies and knowledge result in heightened productivity, creativity, and problem-solving skills. Consequently, employees are adept at optimizing resources, tackling intricate problem situations, driving sales of banking products, and thereby contributing to the realized profit.

5. CONCLUSIONS

Aligned with the primary objective of this study, it has been established that human capital exerts a statistically significant and positive influence on the profitability of banks. Over the past few years, the Republic of Serbia has demonstrated commendable growth rates in GDP and employment. Key contributors to this economic advancement are undoubtedly human capital, embodied through knowledge and competencies, and the banking sector, which plays a vital role in maintaining a stable financial

system. Through strategic investments in the education, skills, and capabilities of their workforce, banks concurrently bolster essential segments of assets and capital, culminating in heightened productivity and robust profitability. This research's significance lies in its contribution to an area where analyses focusing on the impact of human capital on bank profitability in a developing economy, such as the Republic of Serbia, remain relatively scarce—distinct from the ample literature exploring the influence of intellectual capital. Consequently, the study offers a comprehensive understanding of the potency of human capital as a determinant of achieved profitability, carrying both theoretical and practical implications.

Theoretical advancements emerge as the research expands the existing literature concerning the intricate relationship between human capital and bank profitability, particularly within banks operating in developing economies globally. Given the scarcity of such research within the Republic of Serbia, this study concurrently lays a foundation for subsequent scientific analyses. From a practical standpoint, the research outcomes furnish valuable insights that can be effectively communicated to bank managers and HR professionals. Recognizing the predictive power of human capital in actual performance, decision-makers are encouraged to invest in employees, facilitating the acquisition of knowledge and skills conducive to heightened productivity and specialized problem-solving expertise. However, the research is not without limitations, which concurrently serve as guidelines for future investigations. While the Republic of Serbia's economy is in development, broader insights could be gained by expanding the analysis to encompass additional developing economies. To ensure a valid and objective scientific understanding, it is advisable to focus on economies similar to that of the Republic of Serbia. The study is further limited by the relatively narrow scope of bank profitability indicators, necessitating the inclusion of a more extensive array of profitability parameters in subsequent research. Objectivity in scientific results can be enhanced by incorporating additional statistical techniques, such as SEM analysis or panel regression. Furthermore, the relatively short time frame of the research suggests the need for future studies to encompass a more extended period, incorporating data from several years to provide a comprehensive analysis of banks' operations.

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TO THE ESSENTIAL NATURE OF THE FOOTBALL GAME, PART 1: APPROACH TO THE GAME AS A DYNAMIC SYSTEM

Voja Milosavljević^{1}, Željko Rajković², Dragan Perišić¹*

¹ Football Academy, Belgrade, Serbia, e-mail: vojavojam@yahoo.com, dragan.perisic58@gmail.com

² Faculty of Sport and Physical Education, University of Belgrade, Serbia, e-mail: rajkoviczeljko@yahoo.com



Abstract: The aim of the article is to present the nature of the football game, which contemporaries approach as a dynamic system with a tendency to chaotic behavior, connecting it to several scientific disciplines. Relevant studies, which interactively connect football theory with several other disciplines, have pointed out important characteristics of the nature of the football game, which are not sufficiently visible through the prism of traditional science. The analysis of scientific articles highlights: dynamism, complexity, chaoticity, uncertainty, confrontation, reversibility, nonlinearity, flexibility, attractors, fractals, iterations, degrees of freedom. The team is seen as an open dynamic system that has the ability to self-organize and overcome itself. From the point of view of ecological psychology and dynamic systems, the athlete is a complex dynamic system whose subsystems are constantly interacting in order to make firm decisions. The player notices changes in the game scenario, existing constraints, predicts the possible course of the game and makes decisions from a wide range of possibilities that are sometimes unexpected. Speed of recognition of frequently repeated game states, appreciation of role in existing offensive and defensive matrices will enable more effective and efficient behavior at all levels of team organization in both phases. The ability to understand these deep processes of play is identified with sense of play.

Keywords: deterministic chaos, attractor, game configurations, matrix

Field: Social Sciences, and Humanities

1. INTRODUCTION

Our aspiration, to simplify the structure and to forecast the changes of complex phenomena, is the reason to explain the essence of the football game descriptively or on the basis of a linear view of causes and consequences (Čupić, 2009).

From the point of view of conquering the territory, football is a complex collective game in which, on a common surface, two opposing teams, directly and simultaneously, fight each other for possession of the ball, which they should throw into the goal on the opponent's field line and thus win a point that symbolizes success (Ferreira-Ruiz, García-Banderas, & Martín-Tamayo, 2022). The rules of the game regulate bans and thus guarantee equal opportunities for all teams and players. On the other hand, the rules give freedom to the players to find solutions in confrontation with the opponent on all three organizational and strategic-tactical levels: collective, group and individual (Sarhou, 2014). The essence of play should be sought in the intersection of limitations, freedom and conflict (Gréhaigne & Godbout, 2012).

2. MATERIALS AND METHODS

The paper used a combined research method that combines a historical approach to ideas, understandings and practical achievements in the past, with the method of theoretical analysis and the method of content analysis of scientific and professional literature that is not directly related to sports games. The causal method with logical inductive-deductive reasoning is presented using the author's practical experiences in the field of football.

In presenting his thesis in 1989, Gréhaigne, (2018c) expressed his intention to contribute to the adoption of a systemic approach to the study of the essence of football. Reading the works he wrote over a period of 30 years was the impetus for writing this article. In order to understand the experiences so far and the possibilities of applying mathematics, social physics, the theory of dynamic systems and deterministic chaos, the paper explains terms that are less known and rarely used in the theory and practice of football.

*Corresponding author: vojavojam@yahoo.com



3. RESULTS

Areas of interest for competitive activities in football changed in parallel with the change of game dynamics and with the stages in the development of sports science. Then the interest was transferred to the examination of perceptual-cognitive and communicative-informational processes. In recent years, there has been a search for the nature of the football game, as a system in confrontation (Costa, Garganta, Greco, & Mesquita, 2009).

Garganta, (1997) highlights the importance of several personalities who have built concepts for the study of sports games. Teodorescu (2013), who in the 1970s headed the Department of Sports Games at the Institute of Physical Education in Bucharest, dealt with various theoretical and methodological problems and determined the postulates of the theory of sports games. The adoption of a common language that enables the transfer and understanding of the players' intentions was discussed by Teisse as early as 1954 (Garganta, 1997).

Theoretical discussions on strategy and tactics based on the cybernetic model of individual tactical action proposed by Friedrich Mahlo in the 1960s, gave rise to new models that study the process sequence: perception - cognition - motor - memory (König & Memmert, 2019).

Gréhaigne opposes the deductive mirroring of dynamic system theory to sports games and methodological reductionism that sees the system as a simple sum of its parts. Causal approach, inductive reasoning and heuristic methods based on experience, allow following the evolution of the game step by step (Gréhaigne, 2010).

Garganta concludes that the nature of football is dominated by values associated with strategic-tactical dimensions: simultaneous use of space, simultaneous form of actor participation, direct form of struggle over ownership of the ball, control of ownership and the path of the ball's movement, and the oppositional nature of the conflict (Garganta, 1997).

The high level of uncertainty, which arises due to the "pressure of space and time", is reduced if there is a quality process of information and a certain degree of freedom of the player to make a decision quickly (Serra-Olivares, Clemente, & González-Villora, 2016).

This attitude is close to the theory of action (Argyris, & Schön, 1997), the theory of games and the theory of deterministic chaos. Game theory represents a mathematical theory and methodology that deals with quick decision-making about behavior during conflicts between opposing parties such as in the game of football.

Since 1975, the phrase deterministic chaos has been used in science as the name for a theory that has the task of investigating and determining how disorder arises from order and how order can be restored from such a state. It seems nonsensical that determinism and chaos are interconnected. Determinism is a teaching that believes that every event and human behavior follows precisely regulated laws and can be explained by previous causes (Berčić, 2004). In general the term linearity denotes changes that take place in a uniform sequence and are graphically represented by a line.

Kolaković and Vrankić, (2004) believe that the theory of deterministic chaos is a conceptual and methodological tool for understanding the surprisingly complex behavior of seemingly simple structures. Chaoticity is an important and inevitable feature observed in any dynamic system: from the behavior of a pendulum to the natural swarming of bees outside the hive. Chaos theory cannot be separated from the word dynamics, which refers to movement and transition from one state to another. Some theories and practice cannot explain the apparently unusual behavior of the system. However, chaos theory introduces the term attractor, which denotes a set of states through which a chaotic dynamic system moves in a phased, often multidimensional space (Oestreicher, 2007). Attractors can be classified according to different criteria, but for us the division according to regularity is sufficient. Regular attractors are simple sets shown as points or curves. Irregular attractors are complex paths of special types of oscillations, which have a different, irregular shape, chaotic dynamics and are called fractals (Ivanović, 2009). The repetition of a procedure in which the result of the previous procedure is the starting point for the next repetition is called an iteration. In pedagogy, iteration is used to describe a teaching process in which a student repeats the performance of a task until he acquires knowledge or masters a skill (Gojkov, 2007). The number of repetitions tends to infinity, so the following reduced or enlarged versions of the fractal can be endlessly sequenced.

Kuzmanović et al. (2013) believes that if a system has many degrees of freedom, then random movements can occur that not belong to chaotic behavior. Gojkov (2008) takes the position that there is no true science of deterministic chaos, but that there are different social scientific and metatheoretical paradigms that can be applied in social practice with varying degrees of reliability and validity.

The scenario method is used to predict the sequence of changes in non-linear events with a focus

on the causes and the decision-making process. The probability that the scenario will come true increases when possibilities and limitations are taken into account. Depending on the set of variables and conditions that make up the functional unit, taking into account the goal threat, soccer game scenarios can be critical or non-critical (Martins, Mesquita, Mendes, Santos, & Afonso, 2022).

4. DISCUSSION

The game always tends to take the most likely configuration that has many authentic features that temporarily do not change (Gréhaigne, 2007). Each part of the configuration has its own will and a certain degree of freedom to choose ways to achieve its goal. However, the degree of autonomy is limited and conditioned by the needs of interconnected and dependent parts of the organization of the game, which consists of: teams in conflict, team, groups of players, duel-game and individuals (Gréhaigne, Marle, & Caty, 2015).

The team behaves as an open dynamic system with a large degree of freedom, so a large number of parameters are needed to reveal the core of the game (Gréhaigne & Dietsch, 2015).

The more complex the system is, the more open it is to the input of information from the environment, and thus the degree of freedom that is the cause of spontaneous changes in the system increases.

From the approach of ecological dynamics (Araújo, Davids, & Hristovski, 2006), football is a superorganism in which there is a continuous exchange of information that is the basis of spatial-temporal interaction at all levels of organization (Duarte, Araújo, Correia, & Davids, 2012; Travassos, Gonçalves, Marcelino, Monteiro, & Sampaio, 2014). The organizational parts of the game appear as a whole as a collective of dynamic interactions that is self-organizing from within and possesses a self-similar nature that is a fundamental feature of fractals. The parts of the fractal are (according to some characteristic) "similar" to the whole (Ivanović, 2009). Sometimes the notion of self-organization is understood as an emergent phenomenon, which means that the system spontaneously moves to a higher level of complexity through self-surpassing.

In order to achieve this type of continuity and structural integrity, the system should be as flexible and adaptable as possible. It seems counterintuitive that the greater the confusion, the more stable the system. By reaching a critical level of fluctuation (movements or repetitive processes) and perturbation (disruption of proper movement), the system jumps into a new stable state. Then, the degree of entropy, as a measure of the system's tendency to spontaneously move into a state of greater disorder, begins to rise again. As soon as the balance between the two teams is established, player circulation becomes more important than ball circulation (Gréhaigne, Zerai, & Caty, 2009). The established order among the attackers is a favorable condition for the opponent to "read the game" and take possession of the ball, and too much disorder increases the risk of mistakes (Gréhaigne, 2010).

From the point of view of ecological psychology and dynamic systems, the athlete is a complex dynamic system whose subsystems are constantly interacting in order to make firm decisions and perform movement patterns during the game (Travassos, Araújo, Vilar & McGarry, 2011); Serra-Olivares et al., 2016).

Players think and make decisions that can change the course of game development, which is not always in accordance with the needs of a hierarchically higher entity that does not have the ability to control behavior.

Decision making is the player's ability to make the most effective choice from different game scenarios (Silva, Ramirez-Campillo, Sarmiento, Afonso, & Clemente, 2021). Exceptional players make seemingly paradoxical decisions because they see what average people don't and combine things that are incompatible for other people.

Tactical behavior in soccer is assessed by tracking the positioning and movement of players on the field and translates into patterns of cooperation between players and teams. By monitoring the oscillations between the centers of gravity of the teams, it is possible to better understand the balance between the teams on the field, the variations during the game and the level of coupling between the teams (Travassos et al., 2014). The center of gravity of the team is the space around the ball in the shape of a circle, with a radius of 9.15 m (Costa et al., 2009). Remote and directly involved players behave according to the phase of the game: they cause instability in the defense with attacking movements, and they neutralize the danger of a goal with defensive activities.

The self-organization characteristic of the game manifests itself in oscillations that disrupt the stationary state, periodically return to the stationary state, or develop events that tend to restore such a state (Gréhaigne, & Godbout, 2012). In real game conditions energy is spent on movement and overcoming the opponent's resistance. Bringing additional energy to the game (often related to motivational actions of

the players, related to personal volitional characteristics or the dynamics of communication transactions in a team) would encourage forced oscillations, which in a burst of energy can become progressive: to cause a breakdown of the opponent's resistance, or the cessation of oscillation due to a complete loss of energy. In that case, either the result changes, or the rhythm and tempo of the game changes.

Prototypical configurations are temporary stable states of the game that are most often repeated in certain time intervals, so they are considered periodic phenomena (Gréhaigne, & Godbout, 2014). Configurations are grouped according to similar properties, geometric shape and time relations (Gréhaigne, 2007) and allow the structure of the game to be revealed through invariants. Based on the philosophical opinion about the unity of opposites, the invariant explains the immutability of the observed object during transformations. On the other hand, variations mean essential changes of the object (Leung, 2023).

The Effective Game Space (EGS) is an easy-to-use tool for extracting reliable game data (Gréhaigne & Godbout, 2014). The surface of this space is bounded by lines whose vertices are determined by the players' positions in the game area at a given moment. By monitoring the following criteria over time, the evolution of the game can be detected (Gréhaigne & Dietsch, 2015): 1) position on the field and EGS area; 2) position and trajectory of the ball; 3) positions and dynamics of the offensive and defensive playing area; 4) defense matrices and 5) compression/extension.

It is possible to define an offensive (EOS) and a defensive (EDS) effective space that intertwine and provide details of power changes during the match (Gréhaigne et al., 2015). The position of the first striker (the player in possession of the ball) can be behind, forward, in the middle, or on the side of the EOS. EDS appears in the form of an obstacle or a race for the ball. The occupied area of play (OAP) is a surface consisting of a series of EGS occupied by attackers and defenders during an attack.

Depending on whether the EGS takes place on the defensive, maneuvering or attacking side of the field and on which line (front, middle or back) within the EGS the ball is won, a corresponding initial action occurs, the logic of which is found in all subsequent actions (Gréhaigne et al., 2015). Mouchet (2014) uses the term "mother phases", for the initial scenes of attacks from which future forms of attacks arise.

These stages of the game arise at the point where the battle for the ball return was strongest. If the players do not master the large amount of information that appears in that phase in a short period of time, there will certainly be an imbalance in the game and mistakes by attackers or defenders that have further consequences (Duprat, 2019).

Typical ways of ball circulation within the EGS are (Gréhaigne et al., 2015): 1) exchanging the ball on the periphery. 2) guiding the ball on the periphery. 3) long ball through the EGS. 4) exchanging passes through the EGS. 5) guiding the ball within the space of the EGS.

If the attacking team loses possession of the ball behind the EGS (the side closer to their goal), the danger of a goal is obvious. On the other hand, if the ball is lost in front of the EGS forward line, the team moves into the defense phase with more players placed in front of the ball (Duprat, 2019).

By combining the different possibilities of interaction between teams in attack and teams in defense, which are arranged in three different forms: in width, in depth or equally in width and depth, Gréhaigne (2010) presented a theoretical matrix in 1989. which consists of nine different instances of game configurations.

The nine displayed matrices are a set of functionally and logically connected lines that simplify the complex nature of the football game.

Defensive and offensive matrices are simple constructs that can be adapted to the opponent's changes to stop any form of his attack - in the defense phase, or to choose an appropriate way to deceive the opponent's defensive order - in the attack phase (Gréhaigne & Godbout, 2014).

The defense matrix boils down to two patterns: defense in the form of an obstacle or defense in pursuit. Obstacle defense occurs if players of the defending team are placed between the ball and their own goal. In such a situation, attackers organize a slower, positional attack (Gréhaigne, 2010). A more dynamic variant of this matrix is organized by a stepped order of players covering each other while simultaneously marking the opponent, moving axially in the space in front of the goal and in front of the ball (Gréhaigne, 2018b; Duprat, 2019). The pursuit defense most often appears on the counter attack when the attacker with the ball is in front of the EGS with the opposing defensive players chasing after him. It requires the first defender (the player who puts pressure on the ball) to maneuver to slow down the attack, which would give teammates more time to position themselves between the ball and the goal (Gréhaigne, 2018c).

The term reversibility means that the game goes both ways and that a situation of double effect emerges (Gréhaigne, Godbout, & Bouthier, 1999). Before getting possession of the ball, the defending team plans how, with the help of teammates placed forward, they will organize the next (counter)attack. On the other hand, when the first attacker loses the ball, the other attackers (teammates who supported

the first attacker during the attacking phase) form the first line of defense in front of the ball.

The offensive matrix is created by choosing a way to bypass or penetrate the opponent's defensive system and can have the following characteristics (Gréhaigne, 2010; Gréhaigne et al., 2015): 1) the players are spread out wide. 2) the ball is on the periphery and in front of the EGS. 3) the ball is passed from the back line quickly shifts in front of the front line EGS.

The elasticity of the system is monitored through the movement of the ball and player in compression/expansion and through the static state of the player in concentration/dispersion, in EGS (Gréhaigne, 2018c). The compression model appears in a game in a limited space near an attacked or defended goal with a high density of players and slow ball transfer. As soon as a long, or short and quick pass is made outside this field, the game model in expansion (stretching) is created. When the game in the attack zone stabilizes, a form of compression occurs again in front of the goal that is being attacked (Gréhaigne, 2018c).

Concentration and dispersion refer to the number of players who are active in a certain space. When playing in front of the goal, there is concentration (accumulation) in the central axis, and dispersion (scattering) on the periphery of the field. We can consider dispersed systems as a prototype of nonlinear dynamic systems (Gréhaigne, 2018a; Gréhaigne, 2018b).

If, at least in one direction, instead of compression, there is a stretching of the phase space, initially close points will be far away from each other over time, which results in the fundamental indeterminacy of their position and the appearance of chaos (Ivanović, 2009). Variations in the distance between the center of gravity of the players on both teams and among the stretch indices provide accurate information about how the offensive and defensive teams expand and contract relative to each other during the game. This makes it possible to understand the occurrence of scoring opportunities (Duarte et al., 2012; Travassos et al., 2014).

5. CONCLUSIONS

The purpose of this article is to present a discussion of dynamical systems theory and its application to the study of the nature of the soccer game. The text explains concepts that appear in works from the field of sports games, but are used to a greater extent in mathematics, general and social physics.

A football game is conceptualized as a dynamic system in which human behavior can be predicted by monitoring the flow of information and ideas.

The organizational segments of the game have their degrees of freedom to decide which action they will take to continue the game in order to achieve their goal, so the football match is viewed as an open, complex, dynamic, non-linear system that often behaves chaotically. It is a paradoxical fact that maintaining the integrity of the game requires flexibility, instability and change. The greater the perturbations of the game, the more stable the game becomes and moves to a higher order of complexity. In fact, modeling football processes by discovering prototypical configurations - recurring situations, setting up a theoretical matrix of the game is essential for meaningful interpretation and prediction of the future behavior of the structural parts of the game. Despite the research done, our understanding of the game is still very limited.

In the end, the question arises, should we expose a phenomenon whose uncertainty brings a lot of excitement?

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ADAPTIVE MODELS IN THE DISCOURSE OF TOMORROW'S TVET

Iliyan Vasilev¹

¹ Sofia University, faculty of Pedagogy, Bulgaria, e-mail: ilias.vasilidis@gmail.com



Abstract: Technical and Vocational Education and Training (TVET) institutions provide young people with the valuable skills and competencies needed for their seamless transition into the workforce. However, most TVET institutions adopt traditional curriculums and assessment approaches that are irrelevant to testing skills and competencies demanded in the current job markets. This challenge leads to job-skill mismatch and underemployment. This work proposes an adaptive and flexible TVET model that can address the identified challenges by nurturing holistic skill sets, replacing the traditional assessment methods with practical assessment approaches, and incorporating curriculums that reflect current industry practices. The study uses a quantitative approach to collect and present data from various stakeholders (students, employers, and teachers). The results indicate that most students recognize that the current TVET models and systems are ineffective in providing the skills and competencies needed in the current job markets. The participants strongly supported the interventions incorporated into the new model as effective measures for addressing the mismatch between the skills obtained in TVET institutions and skills needed in the workplaces. Moving forward, the TVET institutions should adopt the adaptive model to enhance students' employability and on-job competence. The findings indicate that TVET institutions can benefit from adopting the model, as it will enable them to implement drastic shifts in their landscapes, adapt to the rapid technological changes, and embrace innovation for competency development.

Keywords: TVET, curriculum, adaptive model, graduate employability, assessment, and job market

Field: Education

1. INTRODUCTION

Technical and Vocational Education and Training (TVETs) are recognized as the centers for providing students with practical, in-demand skills to meet the evolving skill needs in the labor market. The 21st-century job market has become more competitive and exigent, demanding graduates with technical and soft skills and adequate exposure to real-life work settings to enhance their knowledge, creativity, adaptivity and problem-solving skills. The increased technology adoption in workplaces and the introduction of artificial intelligence (AI) to automate manual and routine operations implies that graduates must be equipped with more than basic skills to survive the changing job market dynamics. For example, studies illustrate that AI could replace up to 47% of low-skill jobs in the US within the next 20 years and free workers to do more competitive tasks (Shen & Zhang, 2024). This implies that the TVETs should equip students with competitive technical skills to ensure seamless human-machine partnerships in an increasingly inclusive AI-driven world. Equipping students with technical and soft skills to perform high-skill jobs will ensure that the graduates' jobs are complemented rather than replaced by the disruptive adoption of new technologies and automation in modern workplaces. However, most TVET institutions rely on traditional curricula and models that are inflexible and insufficient in meeting the evolving needs of the current labor markets, leading to lack of competence in required skills and labor mismatch (ILO, 2023). It therefore becomes imperative for TVET institutions to adopt new models that equip students with transferable skills based on interdisciplinary curriculum with a strong focus on real-world application and adaptability. Traditional assessment techniques that test students' mastery of theoretical knowledge should be replaced by practical and hands-on assessment activities like simulation and product-making tasks. This paper contributes to the discourse of adaptive models of tomorrow's TVET institutions by proposing an adaptive model with an action-oriented assessment, real-world focus, grouping, and interdisciplinary curriculum for secondary TVET institutions to ensure graduates' smooth transition into the evolving job market.

1.1 Purpose, Problem Statement, and Objectives

The main problem explored in this study is the skill gap and labor mismatch between graduates from the current TVET institutions and the labor market. In the context of rapid technology adoption, increased reliance on data, and demographic transformations, the labor market is rapidly changing thus requiring evolving combinations of technical and soft skills to meet its demand. However, the current TVET institutions are ill-equipped to address this challenge because of their reliance on traditional curriculum,

¹Corresponding author: ilias.vasilidis@gmail.com



non-practical assessments, and lack of adaptive models to identify and nurture creative students with exceptional potential for innovation. This problem is compounded by the increasing adoption of AI technologies in workplaces to automate manual and repetitive tasks, creating a greater need for changing the traditional TVET curricula with adaptive models that can equip learners with ability to perform high-skill tasks. The immediate effect of the current TVET models and curricula is that although the institutions are identified as a sustainable solution to graduate employability problems, their graduates still struggle with low-quality jobs, underemployment, and working poverty associated with the informal jobs (Shi & Bangpan, 2022). This means that in the absence of significant changes in TVET models and curricula, the current TVET programs only enhance the graduate's employability for low-skill minimum-wage jobs, driving them down to the poverty trap and higher risks of joblessness as AI continues to replace their jobs (Shi & Bangpan, 2022). In light of these problems, the overarching purpose of this study is to propose an adaptive model that can trigger the required systemic change in secondary TVET institutions using data collected from a sample of secondary TVET students. The study's first objective is to determine the extent to which current TVET approaches influence skill mismatch and skill gap in the labor market. The second objective is to develop and present the proposed model, highlighting its key characteristics and ability to solve the identified problems.

2. MATERIALS AND METHODS

2.1 Study Design

This study used a quantitative design and surveys to collect data from the target participants. The rationale for using surveys was to facilitate quick collection of accurate data from participants while maintaining their anonymity to encourage honest responses. Step 1 of the study involved communicating the purpose of the study to potential participants and obtaining their informed consent before they were recruited into the study. Precisely, social media and printed posts were distributed in different TVET institutions to inform potential participants about the study's purpose and goals. The posts included information and directions on how interested candidates can contact research assistants. Step 2 of the study focused on providing participants with soft copies of informed consent forms for them to sign. After collecting the signed informed consent forms, the interested participants were provided with participant screening questionnaire developed based on the study's inclusion criteria. The third step encompassed distributing survey questionnaires to the final group of participants and collecting the completed questionnaires. The questionnaires constituted ten questions formulated with respect to a five-point Linkert scale response scheme: strongly agree (SA), agree (A), neutral (N), disagree (D), and strongly disagree (SD). The questions were developed based on the key sub-variables of the study, including graduate employability, skill mismatches, need for adaptive TVET model, and need for policy adaptation.

2.2 Population and Sample Size

The primary target populations for this study were final year students in secondary technical VET institutions, teachers, and stakeholders in the job market. The students were targeted to collect their views on the effectiveness of the current TVET approaches and models to equip them with the needed work-based training. On the other hand, the stakeholders in the job market (human resource experts) were included to provide data on the consistency of the current TVET approaches with the requirements in the job market. This was important because the TVET's primary role is to link graduates with jobs through their formal structured programs. The study therefore collected data from a sample of 50 participants (41 final year students, six teachers, and three human resource experts). The students were recruited through stratified random sampling method while the teachers and human resource experts were purposefully sampled. In terms of demographic characteristics, 31 participants were male, 17 were females, while two of the participants identified as neither males nor females. All participants were aged between 25 and 50 years ($M = 35.7$, $SD = 7.2$), with 51% identified as Whites, 29% as African Americans, 7% as Asian Americans, 6% as Hispanic and the remaining percentage as Other Ethnic group. More than 70% of the student participants were employed in casual jobs while the remaining 30% were concluding their internship programs.

2.3 Research Instruments and Techniques for Data Analysis

Questionnaires were used to collect data from all the participants. The responses were then recorded in Microsoft Excel software for validation and analysis. The research team ensured compliance with ethical guidelines by using pseudonyms instead of participants' real names and implemented strict data access controls to ensure participants' confidentiality. The specific materials and instruments used in

this research included laptops, data analysis software, data recording tools, and access control software. The quantitative data from the survey questionnaires were analyzed using inferential statistics to test the need and effectiveness of the new TVET model. The section below presents the results obtained from the study.

3. RESULTS

The reports and responses from the survey questions were recorded based on their frequencies and scores on the Linkert scale. Table 1 below shows the distribution of responses according to the current TVET infrastructure, approaches, and need for an adaptive model to equip students with workplace-based training that uses real jobs and simulations as the basis for instructions. The statements were derived from the questions.

Table 1: Distribution of Responses According to Characteristics of the Proposed TVET Model and Efficiency of the Existing TVET Approaches (source: field statistics).

Statement	Frequency (f) and %f	SA	A	N	DA	SDA
The current TVET approaches and curriculum are practical.	(f) 11 %f 22	2	4	6	4	32
Need for a shift in the TVET landscape	(f) 34 %f 68	3	6	2	8	8
Need for dedicated learning pathways to challenge and nurture gifted students	(f) 26 %f 52	3	6	9	10	7
Need for interdisciplinary curriculum to facilitate integration of soft and technical skills	(f) 25 %f 50	2	4	6	11	9
Need for real-world focus and adaptability based on on-the-job training model as basis for instructions	(f) 28 %f 56	11	22	12	10	0
Need for action-oriented assessment based on simulations and a shift from the traditional assessment methods.	(f) 22 %f 44	13	26	6	7	2
There is a mismatch between the skills obtained using theory-based instructional methods and those demanded in the job market.	(f) 35 %f 70	8	16	3	4	0

Source: author's research (Feb-April 2024)

Notably, the table illustrates that 64% of the study participants strongly disagreed that the current TVET approaches and curriculum are effective while only 22% agreed that they are effective. Regarding the need for shift in the TVET landscape 68% of the participants strongly agreed that the shift in the current TVET landscape is necessary, whereas only 16% strongly disagreed with the changes. The participants who strongly disagreed with the shift in the TVET landscape justified their responses by pointing out that the entire education system is increasingly becoming irrelevant and lagging regarding practices and skills demanded by the job market. Table 1 also shows that more than half (52%) of the respondents strongly agreed that the current TVET institutions should incorporate dedicated learning pathways to challenge and nurture gifted students. Similarly, 54% (50% SA and 4% A) of the respondents expressed their interests in an interdisciplinary curriculum that integrates soft and technical skills. Regarding the need for real-world focus and adaptability based on on-the-job training, 78% (56% SA, 22% A) of the respondents agreed that the current secondary TVET institutions should use on-the-job training practices that use real jobs as instructional basis. In addition, 70% (44% SA and 26% A) of the respondents affirmed the need for action-oriented assessment based on practical applications, product development, and simulations, whereas only 18% disagreed with the statement. Finally, 86% (70% SA and 16% A) of the participants agreed that there is a mismatch between the skills obtained using theory-based instructional methods and those demanded in the job market. The proposed model therefore aims to leverage the participant responses to develop an adaptive TVET model that will ensure a seamless match between the skills obtained in TVET institutions and the skills demanded in the job market to eliminate the existing gaps between available and demanded skills. The discussion section below fits the study results into the existing fabric of knowledge and provides a diagrammatic representation of the proposed model.

4. DISCUSSIONS

The goal of this study was to develop an adaptive TVET model that responds to the evolving needs of the current job markets based on the insights obtained from data collected from various stakeholders. The key characteristics that the participants recommended to be incorporated into the model include flexibility, grouping, interdisciplinary curriculum, real-world focus and adaptability, and action-oriented assessment. The finding that the model should be based on the shifting landscape of TVET to equip students with transferable skills is consistent with Kanwar et al.'s (2019) suggestion that TVET systems should adopt formal and informal approaches to focus on promoting work-based and community-based learning. Kanwar et al. (2019) claim that for TVET institutions to adequately prepare workers for the skill-demanding jobs in the age of technological transformations, they must shift their systems away from the traditional occupational profiles and focus on new training programs that meet the skills required by the emerging occupations. Enhancing students' abilities to self-learn and innovate is more important in the current labor market than equipping them with vocational know-how learned from theoretical coursework (Kanwar et al., 2019). As such, the secondary TVET institutions should have a flexible curriculum that equips learners with flexible and diverse skill sets to prepare them for emerging occupations and new professions.

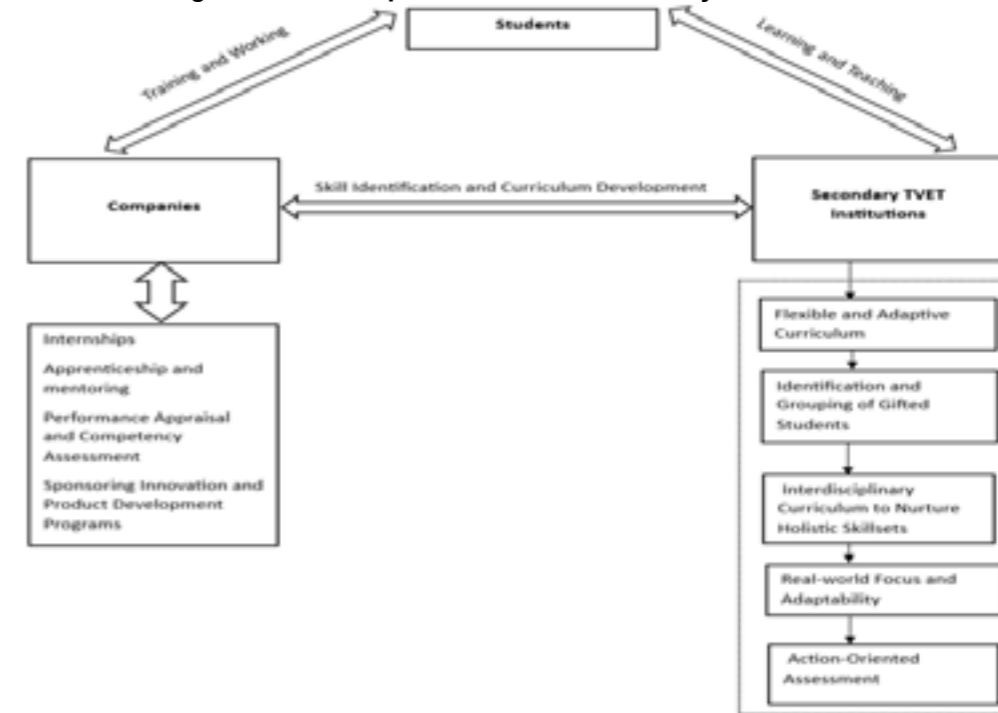
The study also found that based on participants' learning experiences and needs, new TVET models should focus on creating dedicated learning pathways for gifted students. It reaffirms the counterintuitive and overlooked reality that academic underachievement is predictable in secondary TVET institutions. Most gifted students have negative experiences derived from insufficient formal TVET interventions, including low-skill or impractical training content, deficient facilities and poor administrative services. These findings align with Minghat et al.'s (2020) study which established that gifted TVET students have limited opportunities and targeted support. The data also revealed that contemporary TVET systems should nurture holistic skillsets using interdisciplinary curricula to facilitate integration of soft skills with technical expertise. This is corroborated by Ye et al.'s (2024) finding that TVET institutions of the 21st century should adopt a multidisciplinary curriculum that addresses digital literacy, soft skills development, entrepreneurship and innovation, and problem-based learning. The purpose of secondary TVET institutions is to strengthen social cohesion in communities by developing skilled and adaptable workforce, thereby fostering socioeconomic growth (Kamarudin, 2022). To achieve this target, the TVET institutions must adopt an interdisciplinary curriculum with problem-based learning approach, which not only presents students with challenging real-world problems but also encourages them to collaborate when working to find solutions.

The fourth item is curriculums with real-world focus and adaptability to accommodate current industry practices and facilitate students' seamless transition into the workforce. Introducing adaptable curricula that combine on-the-job training for highly skilled practices such as applied science and technology ensures that the trainees fit seamlessly in the job market. For example, TVET institutions should adopt formal work-based learning-by-doing activities in combination with theoretical instructions for technical fields like cybersecurity and engineering to adequately prepare students for jobs in these areas. The curriculums that focus on the real-world problems and solutions equip students with foundational knowledge and skills that are crucial in their fields (Smaragdina et al., 2021). TVET students enrolled in adaptive interventions obtain additional knowledge besides the primary skills targeted, including financial management skills, work readiness and business management skills. The non-technical skills go hand-in-hand with the technical expertise to ensure that the students are not only good in technical competencies but also in soft skill areas like effective communication, problem-solving, emotional intelligence and conflict management (Smaragdina et al., 2021). Recognizing the need for these complex and diverse TVET interventions is an important step toward creating an adaptive and flexible model that accommodates diverse students' needs while addressing the existing skill mismatch.

The final item that should be incorporated into the model is action-oriented assessment. Current TVET institutions rely on the traditional assessment approaches that test students' mastery of theoretical instructions. The problem with these approaches is that they do not test the skills and knowledge required in the real-world working environments where recruits are expected to show their experience and skills in performing various work-related tasks (Yusop et al., 2022). The proposed solution to this challenge in the model is to replace the traditional assessment techniques with practical methods that test students' ability to apply acquired knowledge in real-world working environment. The practical assessment techniques that should be incorporated into secondary TVET institutions' assessment models include product-making assessments, simulations, and competency-based assessments (Yusop et al., 2022). These are better alternatives to written tests, oral questioning (formative in-class assessments) and case studies that most

secondary TVET institutions rely on to test their students because they empower students to take action and prioritize their competency development rather than their ability to master theoretical knowledge (Garraway, 2022). Figure 1 below visually represents the proposed model with its key characteristics.

Figure 1: The Adaptive Model for Secondary TVET Institutions



Source: author's

The model shows that students are central to TVET institutions' interventions and collaborations with companies for sponsoring of special product development and innovation programs. It is student-centered to ensure that the interventions implemented by secondary TVET institutions are tailored to individual needs of students. Based on the model, students access teaching and training from the secondary TVET institutions to gain competence and higher-order thinking capabilities. The training and teaching are based on a flexible curriculum that is developed to reflect the emerging skill needs of the labor market. The horizontal arrow shows the collaboration between companies (stakeholders in the job market) and institutions in development of adaptive secondary TVET curriculums (Cai & Kosaka, 2024). The collaboration ensures that the curriculums are interdisciplinary and flexible to equip the learners with the latest needed skills. The role of companies in this model is to provide mentors, expert speakers, internship and apprenticeship opportunities, as well as sponsoring innovation and product development programs (Cai & Kosaka, 2024). The model therefore facilitates exchange of services and value co-creation among students, colleges and enterprises.

5. CONCLUSIONS

This study set out to present an adaptive secondary TVET model that facilitates students' seamless transition into the workforce through flexible curriculums, action-oriented assessments, and real-world focus that uses on-job training as a basis for instructions. The model is developed based on the valuable insights obtained from participants' input to reflect their needs. It marks a shift from the conventional approaches used in secondary TVETs because it incorporates practical assessment methods and interdisciplinary curriculums which enable students to acquire flexible skill sets demanded by the contemporary job industries. The model will be effective in addressing the skill gaps, skills mismatch, and underemployment facing industries and fresh graduates from TVET institutions.

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MANAGING TRAFFIC SAFETY PROGRESS

Dragana Rankov^{1*}, Nenad Kapor¹, Dejan Spasić², Mohamed Ali Ismail Khalil³, Dejan Anđelković², Miodrag Šmelcerović²

^{1*} Faculty of Civil Aviation, Serbia, e-mail: dragana.rankov@megatrend.edu.rs, nenad.kapor@gmail.com

² University Business Academy in Novi Sad, Serbia,

e-mail: weldspad@yahoo.com, dejan.andjelkovic@fpn.rs, msmelcerovic@yahoo.com

³ Misurata University, Libia, e-mail: mohamed.khalil111@gmail.com



Abstract: Managing road traffic is not an easy task at all. Namely, the field of traffic management itself tends to improve traffic management systems, with the aim of increasing safety and reducing the number of traffic accidents. The aim of this paper is to identify the key factors that can improve traffic safety in the Republic of Serbia, i.e. the key factors that the traffic management system should focus on. For this reason, a survey was conducted that included 148 respondents (traffic inspectors and professors of traffic subjects). Factor analysis was applied to identify key factors. The analysis itself showed that traffic safety on the roads of the Republic of Serbia depends on the quality of infrastructure and training of traffic participants, legal regulations and their application, implementation of technical innovations in driving, as well as international cooperation between traffic inspectors.

Keywords: management, traffic, safety, traffic accidents.

Field: Management

1. INTRODUCTION

Traffic management refers to the management of various aspects of the traffic system, with the aim of ensuring efficiency, traffic safety, and traffic sustainability. The process of managing these activities is particularly complex, due to the fact that the number of cars increases from year to year. For this reason, people who specialize in these areas are constantly developing new systems to increase efficiency in traffic management (Anđelković et al., 2018).

Also, researchers in this field constantly strive to identify key areas, that is, aspects, through which the traffic management system can be improved.

Infrastructure, i.e. the condition of road networks, is extremely important for improving the efficiency and safety of traffic. (Zemlin et al., 2021; Saxena & Kumar-Yadav, 2023) For this reason, it is necessary to constantly work on the improvement of this network, in order to make driving easier and thus reduce the number of traffic accidents. Also, continuous education of traffic participants, as well as strict legal regulations can have a positive impact on reducing the number of traffic accidents. (Al-Tit et al., 2020; Molovčáková et al., 2021; Wang et al., 2019)

Certainly, modern technology has penetrated the core of all human activities, so that traffic does not remain immune. From year to year, smart systems are developed that can improve the efficiency and safety of traffic. (Pawłowicz et al., 2020; Ranka, 2020) Numerous experts in this field evaluate these systems as an opportunity to significantly reduce the number of traffic accidents in the future.

Also, the work of traffic inspectors is extremely important, in order to reduce the number of road accidents, it is necessary for inspectors from different countries to cooperate and exchange knowledge. (Bakhtari Aghdam et al, 2020)

2. METODOLOGY AND MATERIALS

Based on existing research by authors who dealt with the field of traffic safety and whose research results have already been mentioned, and with the purpose of investigating the importance of certain factors for traffic safety management, a survey was conducted in the period from October to November 2023. The very goal of the survey was to provide data, based on the answers of traffic inspectors and professors of colleges and universities in the field of traffic (who teach traffic subjects), which will enable the identification of typical factors that can increase traffic safety and reduce the number of traffic accidents. Respondents, in this particular case traffic inspectors, were offered 25 statements, which they evaluated on a Likert scale from 1 to 5, that is, I absolutely disagree to I absolutely agree.

The data were collected from the respondents electronically (e-mail), as well as by a personal visit of the inspector, after which the collected data were combined and entered into the SPSS software

*Corresponding author: dragana.rankov@megatrend.edu.rs



package for their processing. Data were collected by 148 respondents and all were included in further analysis. In addition to the evaluations of the statements about traffic safety, the respondents also gave answers about gender, age, and the number of years of performing tasks related to traffic and traffic safety.

After the respondents' answers were entered into the SPSS software package, a factor analysis was conducted. In addition to the arithmetic mean, standard deviations, the Bartlett test and the KMO test were used during data processing. After the key factors were determined, the Varimax method was applied, as well as regression analysis, in order to finally apply ANOVA, with the aim of showing whether the derived factors have statistical significance, similarly (Andjelković et al., 2018).

3. RESULTS AND DISCUSSION

As can be seen on the basis of table 1, out of the total number of respondents, i.e. 148 of them, the majority are men. Namely, their participation amounts to 103 respondents, or 69.6%, while the participation of women in this survey is 30.4%. When it comes to the age structure, the largest number of respondents are between 41-50 years old and 51-60 years old.

Table 1 Description of sample

Demographic characteristics	Frequency	%
Gender	148	100
Male	103	69,6
Female	45	30,4
Age	148	100
Until 30	8	5,41
31-40	22	14,86
41-50	60	40,54
51-60	42	28,38
61 and more	20	13,51
Years of experience in traffic-related jobs	148	100
Up to 10	18	12,16
11-15	69	46,62
16-20	36	24,32
21-25	14	9,46
26 and more	11	7,43

Source: Authors

The data from the table show that as many as 60 respondents are between 41-50 years old, and they make up 40.54% of the entire sample. The least respondents are under 30 years of age, and their participation in the total number of respondents is 5.41%, that is, in absolute terms, 8 respondents. When it comes to the experience of respondents in jobs related to traffic, traffic management, and traffic safety, it can be seen from Table 1 that most respondents have between 11 and 15 years of experience, that is, 46.62% of them. The least are those who have more than 26 years of experience in these jobs, that is, 7.43% of them, that is, in absolute terms, 11 respondents.

Table No. 2 shows descriptive statistics and standard deviation for all 25 statements that respondents evaluated regarding traffic safety and traffic safety management.

Table 2. Descriptive statistic

Statement	Aritmetic mean	Standard deviation
1. Implementation of advanced solutions for monitoring and analyzing driving performance can improve traffic safety	4,14	0,699
2. Strengthening cooperation between traffic inspectors between countries can improve traffic safety	4,07	0,878
3. Pointing out traffic rules in educational radio broadcasts can increase traffic safety	4,01	0,782
4. Information sharing between traffic authorities from different countries can improve responses to security challenges	4,11	0,733
5. Organization of social marketing campaigns on traffic safety can have a positive effect on driver awareness	3,99	1,022
6. Mandatory education for pedestrians about traffic regulations is necessary	4,01	1,072
7. Scientists in Serbia must deal more with the topic of traffic safety	4,06	0,969
8. Organizing training through television shows can reduce the number of traffic accidents	3,92	1,001
9. The system of traffic signs and signaling on the roads must be improved	3,91	0,968
10. In secondary schools, more attention should be paid to traffic education	4,01	1,069
11. Texts about traffic safety in newspapers can reduce the number of traffic accidents	3,61	1,016
12. It is necessary to constantly take care of the quality of signs and signaling on the roads	3,81	0,989
13. It is necessary to improve the road infrastructure in order to reduce the number of traffic accidents	4,03	1,015
14. Continuously solving the problem of potholes on the roads can reduce the number of accidents	4,05	0,799
15. Mandatory education on traffic regulations for drivers is necessary	3,86	0,899
16. It is necessary to clearly define and control the working hours of truck drivers	4,41	0,691
17. It is necessary to punish drivers more severely for violating traffic regulations	4,39	0,771
18. It is necessary to increase the penalties for those who knowingly endanger traffic safety	4,21	0,791
19. The introduction of advanced systems in driver's vehicles can lead to a reduction in the risk of traffic accidents	4,45	0,791
20. The development and application of a system for detecting the alcoholic state of drivers can reduce the number of traffic accidents	3,96	1,116
21. The development and implementation of fatigue detection systems can reduce the number of traffic accidents	3,99	0,969
22. The introduction of smart systems in cars, which have an impact on the insurance premium paid, can have a positive effect on the reduction of traffic accidents	4,02	0,862
23. It is necessary to ensure adequate application of defined legal regulations	4,34	0,731
24. Joint trainings at the international level can improve the work of traffic inspectors and increase the level of traffic safety	4,05	0,771
25. It is necessary to improve traffic safety in the Republic of Serbia	4,11	1,061

Source: Authors

As table number 2 shows, statement 16, which refers to the control of working hours of drivers of off-road vehicles, was rated the best. The respondents rated statement number 11 the worst, which refers to raising the awareness of drivers through newspaper articles on traffic safety. In the following, a factor analysis will be carried out, in order to reduce the large number of factors and to group the statements into a certain number of factors. In order to be sure that we can apply factor analysis, the following table shows the results of the Kaiser-Masiel-Olkin and Barthelet tests.

Table 3. Results of the Kaiser-Meyer-Olkin and Bartlett test

Kaiser-Meyer-Olkin test	0.897
Bartlett test	2898.995
Df	269
Sig.	.000

Source: Authors

Based on the results from the table, that is, the conducted tests, it can be concluded that it is possible to apply factor analysis with the aim of grouping factors. After rotating all the factors, using the Kaiser's criterion, it was determined that all the statements that the respondents evaluated, that is, the factors, can be grouped into four factors. These four factors explain 67.611% of the variance, which is shown in table 4. After the most significant components were determined using factor analysis, their

rotation was performed. It was done using the Varimax method, and only those factor components with factor weights that are statistically significant (>0.05) were selected.

Table 4 Analysis of the most important components

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	11.629	48.990	48.990	11.629	48.990	48.990	7.411	31.441	31.441
2.	1.894	7.871	56.851	1.894	7.871	56.851	3.589	14.112	45.553
3.	1.511	6.269	63.120	1.511	6.269	63.120	2.796	11.899	57.452
4.	1.101	4.491	67.611	1.101	4.491	67.611	2.297	10.159	67.611
5.	0.939	3.899	71.510						
6.	0.768	3.308	74.818						
7.	0.694	3.046	77.864						
8.	0.631	2.662	80.526						
9.	0.591	2.398	82.924						
10.	0.482	1.957	84.881						
11.	0.426	1.801	86.682						
12.	0.409	1.722	88.404						
13.	0.392	1.569	89.973						
14.	0.341	1.423	91.396						
15.	0.309	1.298	92.694						
16.	0.271	1.131	93.825						
17.	0.249	1.038	94.863						
18.	0.231	0.946	95.809						
19.	0.215	0.921	96.730						
20.	0.198	0.852	97.582						
21.	0.169	0.731	98.313						
22.	0.151	0.626	98.939						
23.	0.131	0.554	99.493						
24.	0.118	0.507	100.000						

Source: Authors

Table 5 shows the matrix after factor rotation. As the table itself shows, the first factor related to infrastructural and educational activities was assigned 12 statements, where the lowest factor weight is 0.581 (greater than 0.5). 4 statements were added to the second factor related to technical innovations and their application. Three statements are attached to the third factor, which refers to the necessity of improving legal regulations, while two statements are attached to the fourth factor, and it refers to international cooperation and its contribution to the improvement of traffic safety, based on the reduction of the number of road accidents. Defining these four factors creates a basis for applying regression analysis and determining whether these factors influence the dependent variable, i.e. 25 findings from table 2. The results of the applied regression analysis show that all four factors have an impact on the dependent variable and the results obtained are statistically significant. As the table itself shows, the coefficient of determination, which shows how much the variability of the dependent variables, explains the independent variable in this case is 0.481.

Table 5. Results of Varimax method

	Components			
	1	2	3	4
The system of traffic signs and signaling on the roads must be improved	0,808			
It is necessary to constantly take care of the quality of signs and signaling on the roads	0,799			
It is necessary to improve the road infrastructure in order to reduce the number of traffic accidents	0,785			
Mandatory education on traffic regulations for drivers is necessary	0,779			
Organizing training through television shows can reduce the number of traffic accidents	0,774			
Mandatory education for pedestrians about traffic regulations is necessary	0,771			
Texts about traffic safety in newspapers can reduce the number of traffic accidents	0,719			
Organization of social marketing campaigns on traffic safety can have a positive effect on driver awareness	0,711			
Pointing out traffic rules in educational radio broadcasts can increase traffic safety	0,701			
Continuously solving the problem of potholes on the roads can reduce the number of accidents	0,619			
In secondary schools, more attention should be paid to traffic education	0,602			
Scientists in Serbia must deal more with the topic of traffic safety	0,581			
The introduction of advanced systems in driver's vehicles can lead to a reduction in the risk of traffic accidents		0,839		
The development and implementation of fatigue detection systems can reduce the number of traffic accidents		0,799		
The development and application of a system for detecting the alcoholic state of drivers can reduce the number of traffic accidents		0,765		
The introduction of smart systems in cars, which have an impact on the insurance premium paid, can have a positive effect on the reduction of traffic accidents		0,597		
Implementation of advanced solutions for monitoring and analyzing driving performance can improve traffic safety				
It is necessary to punish drivers more severely for violating traffic regulations			0,841	
It is necessary to clearly define and control the working hours of truck drivers			0,799	
It is necessary to increase the penalties for those who knowingly endanger traffic safety			0,554	
It is necessary to ensure adequate application of defined legal regulations				
Strengthening cooperation between traffic inspectors between countries can improve traffic safety				0,819
Information sharing between traffic authorities from different countries can improve responses to security challenges				0,524
Joint trainings at the international level can improve the work of traffic inspectors and increase the level of traffic safety				

Source: Authors

In order to be able to accept the results of the analysis as statistically significant, an ANOVA analysis was conducted, the results of which are shown in table 7. The results of the Anova analysis show that in this particular case Sneder's F-statistic is 36.625 and is statistically significant, which confirms that the influence all four factors on the dependent variable statistically significant.

Table 6. Regression analysis

Model	The correlation coefficient (R)	Coefficient of determination (R ²)	Adjusted coefficient of determination	Standard error value
1.	0.531 ^a	0.279	0.263	0.874
2.	0.598 ^b	0.399	0.381	0.803
3.	0.679 ^c	0.412	0.401	0.699
4.	0.684 ^d	0.481	0.458	0.773

Source: Authors

All the results shown in the tables clearly indicate that the previous research on the basic factors that can contribute to the improvement of the traffic safety system in the Republic of Serbia has also been confirmed, based on the research that was conducted. Namely, based on the conducted analysis, it can be clearly seen that the infrastructure and education of road users are one of the crucial factors in reducing the number of traffic accidents on the roads, as proven in their works by Zemlin et al. (2021), Saxena & Kumar-Yadav (2023), Al-Tit et al. (2020), Molovčáková et al. (2021) and Wang et al. (2019), Andjelković (2019), Andjelković et al. (2019), Andjelković et al. (2018). Also like Al-Tit et al. (2020), Molovčáková et al. (2021) and Wang et al. (2019), this paper proved that continuous education of road users is one of the key safety factors.

Table 7. ANOVA analysis

		Sum of squares	Number of degrees of freedom	Mean square	F statistics	Significance
1.	Regression	51.211	1	51.211	64.291	.000 ^a
	Residual	135.114	146	0.787		
	Amount	186.325	147			
2.	Regression	75.981	2	37.991	62.124	.000 ^b
	Residual	107.829	146	0.661		
	Amount	183.810	147			
3.	Regression	86.112	3	28.704	45.398	.000 ^c
	Residual	101.981	146	0.618		
	Amount	188.093	147			
4.	Regression	89.991	4	22.498	36.625	.000 ^d
	Residual	99.102	146	0.596		
	Amount	189.093	147			

Source: Authors

Also the results obtained by Pawłowicz et al. (2020) and Ranka (2020) were confirmed in this research. They refer to the application of modern technology with the aim of improving traffic safety. This is a topic that, among other things, will increasingly attract the attention of the scientific and professional public in the future.

International cooperation between inspectors can also contribute to the improvement of traffic safety, which is proven in this work. In this way, the results obtained by Bakhtari Aghdam et al. were confirmed. (2020).

4. CONCLUSION

The traffic safety of the participants largely depends on whether the traffic is managed in an adequate manner. Namely, traffic management is not at all a simple task and must be adapted to the conditions of the country in which it is managed. This paper identified the most significant factors that have an impact on the growth of traffic safety and the reduction of the number of traffic accidents in the Republic of Serbia. Namely, it has been proven that the education of traffic participants, the development of infrastructure, the implementation of modern systems, as well as legal regulations and international cooperation can positively influence the growth of the level of traffic safety.

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THE RIGHT TO LIFE AND THE DEATH PUNISHMENT AS ITS DEROGATION

Dragana Lazić¹, Goran Džafić², Aleksandar Matić¹

¹ Faculty of Business and Law, MB University, Belgrade, Serbia,
e-mail: dragana1908@yahoo.com, aleksandarmatic.ppf@gmail.com

² Ministry of Justice, Belgrade, Serbia, e-mail: goran.dzafic@mpravde.gov.rs



Abstract: Although in developed countries (many these countries) the existence of the death penalty is no longer questioned, nor is there a dilemma regarding this penalty in modern legislation, the reports of international organizations that monitor this phenomenon are worrying. According to the latest reports, in the year 2023, 1,153 death sentences were carried out in the world, which shows that even though the number of countries abolishing this punishment is increasing, the number of executed death sentences, accordingly, should be decreasing, but it is not. In addition, new methods of execution of the death penalty are being introduced, which shows that there is no intention to abolish it, although international acts require such an obligation. This was a signal to the authors of the paper to try to explain the concept of the death penalty and the issues related to it that arise in science, practice, religion, morality, and increasingly in society from a scientific and professional perspective. The main scientific goal of the work is to understand the reasons for the introduction, and still exist, of the death penalty in certain countries, as well as to find modalities of punishment that are an adequate substitute for the death penalty and to achieve fairness and proportionality in punishment. In the research, almost all basic methods of knowledge and research were applied, and statistical and comparative methods were used from the general scientific methods, while from the methods for data collection, only the method of content analysis of documents, laws and annual statistical reports of the Republic Institute of Statistics was used. Using the historical-comparative method, in the first part of the work, the authors dealt with the historical aspects of the origin of this punishment, its morphoses, as well as its disappearance from most legislation. After that, we carry out a detailed analysis of the application of the death penalty on the territory of Serbia, today's Republic of Serbia, but also in the world. The work ends with the discovery of perspectives related to the death penalty, its abolition, but also its reintroduction in some countries or changing the methods by which it is carried out, which is widely debated in society today. This is exactly what explains the social goal of the work, which consists in proving the harmfulness/benefit of the executed death penalty on the increase/decrease of criminality in society and its moral, religious, medical and legal justification. The death penalty has its alternatives and can be very effectively replaced by some other punishments that would also justify the purpose of punishment. For example, the introduction of life imprisonment (with or without the possibility of parole or some other variation) is one of many alternatives to the death penalty. Although life imprisonment has its advantages and disadvantages, and it is not the most ideal, at least it has the possibility of "correcting a mistake" if a mistake occurs in the court proceedings, it is more humane and allows convicted persons to have at least some hope that one day they will be free again (life imprisonment with the possibility of parole) which is already a step forward in the development of humanity. If, even after all the arguments presented, there is doubt as to whether the death penalty should be included in the legislation or not, it is only necessary to answer the research question: has crime and illegal behavior been eradicated in countries that have the death penalty, and has its application had a good effect to reduce criminal activity? The answer is: No! Therefore, the conclusion is that the purpose for which the death penalty was introduced was not achieved.

Keywords: fundamental human rights, right to life, death penalty, derogation of the right to life, amnesty.

Field: Social sciences

JEL classification: K10, K14, K38, K42

1. INTRODUCTION

The meaning and importance of the right to life, the appropriate way to protect this right, but also the limitations in its enjoyment have always represented a huge moral, religious, legal, but also social dilemma and represented an issue around which consensus in society was very difficult to achieve. How to protect the right to life? Who should protect the right to life? Who can limit the right to life? How should the state react in case of non-respect of the right to life? How should society react in case of disrespect, denial of the right to life? To what extent should international law be allowed to interfere with the protection of the right to life in domestic, national law? Is the existence of the death penalty the main and most severe form of derogation of this right? Are all other rights worthless if the right to life is derogated? These are all dilemmas that the authors deal with in this paper and that they recognized as currently and permanently socially relevant, which is supported by the latest announcements of organizations that deal with the research of these phenomena, where it was stated that in the previous year (2023) the most of

¹Corresponding author: dragana1908@yahoo.com



death sentences since 2015. What is generally noticeable is that the number of countries that apply the death penalty is decreasing (either they have abolished the death penalty in their legal system or such a penalty still exists formally in law, but is not applied in practice), but that the number of executions of death sentences is increasing.

The Republic of Serbia has had a clear position on this type of derogation of the right to life for a long time. The death penalty does not exist in the Republic of Serbia. However, the issue of re-introduction of this type of punishment is often present as a social issue in the case of the murder of a child, in the case of the murder of several persons, in the case of great recklessness, the use of violence and the manifestation of treachery during the execution of criminal acts, which is why the re-introduction of this punishment is very often mentioned.

2. THEORETICAL FRAMEWORK

The death penalty appears as the most severe form of denial of the right to life (exerted by the state). There are also other ways of attacking the right to life (for example, various types of murder that come from individuals, members of a society that is known to be illegal in any case and under any circumstances), but there are also some types of deprivation of the right to life, which are justified and allowed in some countries, which are legal and legitimate, and such ways of derogating the right to life cause polemics and do not find justification, approval and acceptance around the world, i.e. there is no uniform practice or equal treatment in all countries (for example: euthanasia, killing in self-defense, killing in war, environmental hazards, etc.).

The authors decided to emphasize the problem of the existence of the death penalty as a form of derogation of the right to life, for the reason that we believe that the biggest problem is the violation of fundamental human rights by the state, and that if the right to life is attacked by the state that is primarily expected to provide protection that right, then it is completely worthless to discuss the violation of the right to life by individuals, residents of that country.

Mention of the death penalty dates to Hammurabi's code around 1750 BC. Whenever it was mentioned, it carried with it some restrictions in the form of methods or conditions of execution, and it was precisely these restrictions that led to its final abolition.

Among the first countries to abolish the death penalty were Venezuela (1863), San Marino (1865) and Costa Rica (1877). The Republic of Serbia, as a responsible, democratic state, also abolished the death penalty in accordance with its obligations from the International Covenant on Civil and Political Rights (Second Protocol from 1989), as well as Protocols No. 6 (from 1883) and No. 13 from in 2002 with the European Convention on Human Rights (1950). The Republic of Serbia ratified the European Convention on Human Rights on December 26, 2003, and it has been legally effective since March 3, 2004.

This convention strictly states that the right to life is a fundamental right and that because of its existence, states have some positive and negative obligations. Under negative obligations, it is understood that the signatory states of the Convention must not undertake actions that harm basic human rights. It is also determined that states have a few positive obligations in the form of undertaking protection, i.e. ensuring the conditions for the realization of basic human rights (primarily the right to life). Article 2 of the European Convention on Human Rights directly protects the right to life of "every person". This term has been called into question many times through science, because a dilemma has arisen whether natural and legal entities can be classified under this term, or whether it directly refers only to human life. The dilemma was resolved through practice, so it was established that the European Convention on Human Rights can also apply to legal entities, i.e. companies, in the part that defines the right to property, the right to a fair trial, the right to freedom of expression, the right to association, the right to freedom of religion etc. The main purpose of Article 2 of the mentioned Convention is that it protects the individual from "unlawful taking of life". Therefore, taking a life in accordance with the law of a sovereign state is allowed (so, taking a life is not illegal if it is for the purpose of defending a person from illegal violence, if it is for the purpose of preventing the escape of a person legally deprived of liberty, if it is for the purpose of suppressing disorder, if in deprivation of life as part of legally permitted actions in the event of a war conflict, etc.).

According to the Constitution of the Republic of Serbia (Constitution of the Republic of Serbia, 2006) in Article 24/2 it is determined that "There is no death penalty in the Republic of Serbia". During its existence and implementation, it was carried out without the presence of the public, before a commission consisting of a judge, a public prosecutor, a prison warden and a lawyer - a defense attorney for the convicted. The punishment was carried out by a firing squad of eight policemen shooting at the condemned, and only half of them had combat ammunition, and the policemen (executioners) did not know what ammunition they

had (due to "conscientious objections"), so it was not known which shot was deadly. The death penalty in the Republic of Serbia was partially abolished by the Constitution of the Federal Republic of Yugoslavia (1992) when it was prescribed that the death penalty be abolished only for criminal offenses prescribed by federal law, which meant that it could be imposed for criminal offenses that were under the jurisdiction of federal units. All dilemmas regarding the death penalty in the Republic of Serbia were removed on March 8, 2002, when the provisions of the amended Criminal Code (Criminal Code of the Republic of Serbia, 2019) entered into force, which formally abolished the death penalty.

It is necessary to note that even when the death penalty existed in the Republic of Serbia, it had certain limitations, and the legislator strove to be fully in accordance with the principle of legality and the principle of humanity. The death penalty could not be imposed on a person who had not reached the age of 21 at the time of the commission of the crime, as well as on a pregnant woman - thus denying the right to life of the unborn child.

3. RESEARCH CONTEXT

In this part of the work, we will investigate the derogation of the right to life in the territory of today's Republic of Serbia and, with the application of the historical-comparative method, find out at what level of development the Republic of Serbia is in relation to other developed countries, viewed through a historical prism regarding the establishment, application, and abolition of the death penalty. Written traces of the existence of the death penalty date back to 1804, and data on the state of sentences pronounced and carried out can be traced back to that period. However, it is known that deprivation of life was punished in the territory of today's Republic of Serbia long before the mentioned period.

For example, looking at the Collection of Laws and Decrees of the Principality of Serbia issued in 1858, we see that some dilemmas arise regarding the death penalty. The question is how to carry out the death penalty and what to do with the dead bodies? Prince Aleksandar Karađorđević issues the order to kill the person sentenced to death with a rifle and to bury his body immediately in the ground (Principality of Serbia, 1858). Back in 1859, when Prince Miloš Obrenović came to power, the punishment of whipping was abolished, because it was considered "against the spirit of the times and humanity". It is replaced by a prison sentence according to the scale set in the Decree of January 31, 1853, which shows us that in the territory of today's Republic of Serbia, there was also an awareness of the inadmissibility of inhuman and degrading treatment (Principality of Serbia, 1859). Later, by order of Prince Milan Obrenović, from December 11, 1873, corporal punishment was completely abolished (Principality of Serbia, 1874).

The death penalty in the Kingdom of Yugoslavia was carried out by hanging (Lazić, 2020). This punishment is something that is used in a state of emergency due to the needs of the country. Before these provisions, the death penalty was carried out by firing squad. It was expected that the execution of the death penalty by hanging would be much more humane, and that it would produce much less pain during the execution, which takes place in the shortest possible time. This sentence cannot be imposed on a person who has not reached the age of 21. The death penalty, according to the Criminal Code of the FRY, could be executed by shooting or hanging.

The authors reviewed the Bulletins of the Republic Institute of Statistics regarding the issue of the death penalty and the frequency of its execution, starting from the first written traces, and present the available data in the following tables. The years of the observed period are presented in the first column, and the number of death sentences imposed in the second column.

Table 1: Number of persons sentenced to death in the territory of today's Republic of Serbia observed in the period from 1947 to 2002

1947.	1948.	1949.	1950.	1951.	1952.	1953.	1954.	1955.	1956.	1957.	1958.	1959.
127	56	187	180	48	70	30	11	11	12	5	15	2
1960.	1961.	1962.	1963.	1964.	1965.	1966.	1967.	1968.	1969.	1970.	1971.	1972.
3	5	4	6	1	3	5	0	2	4	3	0	4
1973.	1974.	1975.	1976.	1977.	1978.	1979.	1980.	1981.	1982.	1983.	1984.	1985.
3	1	4	6	4	4	5	3	3	0	3	1	3
1986.	1987.	1988.	1989.	1990.	1991.	1992.	1993.	1994.	1995.	1996.	1997.	1998.
3	4	2	1	0	0	0	0	0	0	0	2	3
1999.	2000.	2001.	2002.									
0	1	2	0									

Source: Author's research / Bulletins of the Republic Statistical Office from 1947 to 2002

Based on the collected and analyzed data during the 55-year observed period, according to the official data of the Republic of Serbia, a total of 852 death sentences were imposed (an average of 16 death sentences were imposed annually). According to the Bulletins of the Republic Institute of Statistics, it is not possible to know how many of the imposed death sentences were carried out.

However, there are studies that document that from 1804 to 2002, on the territory of today's Republic of Serbia (it should be emphasized that this period also included the period of Yugoslavia's existence, and that the territory was much larger than what we consider today to be the territory of the Republic Serbia) imposed a total of 7,039 death sentences (Serbia against the death penalty, 2024). Of these, 4,964 people were sentenced, of which 145 were women. We have 1,769 amnestied persons and no death sentence was carried out on them. If we look by gender, 169 female persons were granted amnesty in the observed time period. There are also sources that indicate that 126 persons escaped or died before the execution of the death sentence (six of which were female).

Although it seems that the number of persons sentenced to death penalty is large, it should be kept in mind that this is a very long period of time that is being discussed, that the research in the paper covered almost the entire century of the existence of a state from its roots, from the first written traces and that in that period there were also war conflicts when death sentences were pronounced more often (for example, for the crime of high treason, espionage, etc.). In the final number of death sentences imposed, a very large number of death sentences were imposed by military courts (1974 persons), while regular courts, courts of general jurisdiction, imposed a total of 2,906 death sentences, of which 1,240 persons were amnestied or escaped before the execution of the death sentence or died before execution of the death penalty.

Based on all of the above, we can conclude that the death penalty, in the territory of Serbia, has never been a high-frequency criminal sanction, and that the courts in the territory of the Republic of Serbia have always chosen its alternatives that would satisfy the purpose of punishment.

4. DISCUSSIONS

There are many written and unwritten traces dating back far into the past about various types of deprivation of life and customs of punishing persons who claim the right to take someone's life. For example, even in tribal communities "among the tribes at the mouth of the Wanigela River, in New Guinea, a man who kills someone is considered impure until he undergoes certain purification rites. And when he has passed them, he puts on his best jewelry and as many badges as the men he has executed; then armed, he goes outside and struts around the village. The next day, the locals smeared kangaroo liver on his back. Then he goes to the nearest river, steps into it, spreads his legs, and while he is washing, all the young and inexperienced warriors swim between his legs, gaining courage and strength. The next morning, he rushes out of the house fully armed and loudly shouts the name of his victim. Only after he was convinced that he had completely frightened the spirit of the murdered man, he would return home." (Avramović & Stanimirović, 2009).

These practices or practices similar to these cannot be allowed nowadays, when the awareness of human life, rights, obligations, and morality is at a much higher level than it used to be. It is unacceptable that there is any country or any part of the world where human life is not safe, where there is no primacy in protection and where human rights are violated to the point of complete denial of the right to life. International organizations have contributed a lot to protect the right to life, from many derogations, not only from a direct attack on life in the form of the death penalty, but also from other types of attack (illegal use of excessive force, killings while persons are deprived of their liberty, environmental hazards, denied medical care, etc.), but the reports of organizations that monitor the state of protection of the right to life indicate that practice and regulations are still not harmonized.

In many cases, we observe that the practice of the European Court of Human Rights has helped in understanding, forming the right/legal opinion about the existence or non-existence of violations of rights (national and international) regarding the death penalty or the fear caused by the very threat of its existence. By analyzing cases such as: *Incal v. Turkey* (1998), *Çiraklar v. Turkey* (1998), *Vilvarajah and Others v. the United Kingdom* (1991), *Campbell and Cosans v. the United Kingdom* (1982), *H. L. R. v. France* (1997), *Ocalan v. Turkey* (2005), *Furman v. Georgia* (1972), (Mugambi, 2022) we can clearly establish which articles of the Convention and its associated Protocols are respected and are working in practice.

The work of international bodies and organizations has had an effect, but the data provided by Amnesty International in the latest report on the issue of the death penalty and the frequency of its execution (Amnesty International Global Report 2023, 2023) are devastating and indicate that all of

humanity must be involved in the fight against such practices of individual countries (Lago, Fajar, & Syofyan, 2023).

According to the latest report for the previous year (2023), there are twelve countries in which death sentences are constantly carried out, and in some of them, or rather most of them, the number of death sentences imposed and carried out is increasing. Those countries are China, Iran, Iraq, Egypt, Saudi Arabia, Yemen, USA, North Korea, Vietnam, Bangladesh, Syria and Somalia. For some of the mentioned countries, the data are not surprising, given the level of social development and awareness, the way of government, economic power, the level of state (lack of) control, but the data for individual countries are absolutely surprising, considering the level of their development, but also their struggle (at least the one that is shown to the rest of the world) for human rights, as well as the degree of technical and technological development (USA and China).

If we look back at the ways of executing the death penalty, this way of derogating the right to life, (in Saudi Arabia the death penalty is carried out by beheading, in some countries by hanging - Egypt, Iraq, Iran, Singapore, Syria, Bangladesh, in some countries the death penalty is used injection - China, USA, Vietnam, and in some it is carried out by shooting - Somalia, Yemen, China, Palestine, North Korea, Afghanistan) we note that they are completely contrary to the guaranteed fundamental rights - the right to life, but also contrary to the postulates of prohibition torture and inhuman degrading treatment. Preparation for the execution of the death penalty, the act of shooting, giving the lethal injection, hanging, are all stages of the execution procedure that cannot be made more humane in any way except to be completely abolished.

The crimes for which the death penalty is most often imposed as a form of derogation of the right to life are crimes related to intoxicants - narcotics (China, Iran, Kuwait, Saudi Arabia, Singapore), corruption (China), apostasy (Iran), sexual relations before marriage (Iran), kidnapping (Saudi Arabia), rape (Bangladesh, Egypt, Iran, Pakistan and Saudi Arabia), as well as espionage, treason, terrorism and similar acts committed against the government (Iran and Saudi Arabia).

Compared to all the countries around the world, we can establish that Serbia (both in the form it is in today and in the form and state structure it has been in since its creation) is a country that was created, developed, changed, increased and reduced its borders, but always protected democratic principles, basic, human, fundamental rights. It is true that the principle of "talion" was applied in the territory of today's Serbia, it is also true that in the era of Dušan's code, the principle of "an eye for an eye, a tooth for a tooth" was present, but it is also true that until the abolition of these principles (formally or factually) on the territory of today's Serbia, came much earlier than in most countries that are considered "cradles of democracy and legal security".

5. CONCLUSIONS

The death penalty is still a reality, although there is a tendency to abolish it in many countries of the world.

New reasons for abolishing the death penalty are noticeable every day. In addition to the fact that the whole concept of the death penalty is inhumane and outmoded, the loudest advocates are those who claim that no one has the right to deprive someone of their right to life, that when the death penalty is carried out there is no "possibility of correcting a possible judicial error" (there are data that testify that in during the 20th century in the USA in more than 450 cases it was proven that the death penalty was carried out on innocent people), and that the "preventive function" that was believed to be very pronounced in the case of the death penalty does not actually exist, and that the countries that introduced the death penalty and which have retained it and apply it, also have a high level of criminality. The act of executing the death penalty in most countries is very inhumane, as well as staying in "death cells" while awaiting execution, after which executions often happen (there are studies that testify that during the year 2000, 682 sentenced persons were awaiting the execution of the death penalty, and it was executed on them 19).

The authors are pleased with the tendency to abolish this type of punishment, which is supported by the data that in 1977 only sixteen countries abolished the death penalty. After thirty years, 129 states have formally or in practice abolished the death penalty. At the time of writing, 144 countries have abolished this penalty. This year (2024) the death penalty was carried out in 15 states.

What is worrisome is that some countries have marked the data on pronounced and executed death sentences as a state secret (China and Vietnam), while others publish data that is either reduced or very difficult to access (Iran, Saudi Arabia, North Korea, Belarus), so the data that exists is collected from the family, from the defenders, from the media, associations for the fight for human rights, etc.

In the course of 2023, of the 193 members of the United Nations, the death penalty was applied in fifteen, that is, in 8% of the membership, which is statistically a minority, but taking into account how much of a “stroke” it is to human rights and human freedoms and what consequences it brings carries, as well as what the situation in that country indicates, then it is clear that even a percentage that is at the level of a “statistical error” cannot be tolerated.

Of particular concern is the fact that society justifiably expects that countries that apply this punishment will take steps towards abolishing the death penalty, while the situation is quite different, and that some are introducing completely new methods of execution. The methods of executing the death penalty are different and have changed over time, including stoning, shooting, beating to death, electric chair, beheading, breaking with a wheel, lethal injection (Lee, 2022), and now, in the year 2024, the U.S. nitrogen gas poisoning as a form of execution also withered. A man in Alabama, USA, is the first victim who was deprived of his life in this way. The reasoning of the American authorities was that the main reason for introducing a new method of taking life is that it is difficult and expensive for the state to find the ingredients of a lethal injection, as well as that the victim does not suffer pain in this way, death occurs quickly, and this method is even more humane from previously applied ones. Inventing new methods of execution is a step backwards for humanity.

Disputing the existence of the death penalty and its application is understandable for several reasons: (1) in many countries, it is allowed to carry out the death penalty on persons who are eighteen years of age or younger (although it is mainly in those countries for coming of age and acquiring certain rights and obligations it is necessary to turn 21 years old) - in some countries, the death penalty was carried out on minors who failed to prove their date of birth due to the lack of proper state records (Congo, Iran, Nigeria, South Sudan, etc.), (2) due to inadequately conducted criminal proceedings, evidential procedure primarily, due to corruption in the judiciary or other procedural bodies, the persons failed to prove their insanity (Avvisato, 2021), (3) the death penalty is imposed based on the confession of a person, and that confession can be, and often is, the result of torture by state authorities or the absence of a defense attorney (Niven & Mallory, 2024), (4) the imposition of the death penalty in some countries is at the level of “mandated punishment” which is the result of a “shortened procedure”, (5) there are countries in which military courts pass verdicts against civilians that result in the imposition of the death penalty, (6) the existence of the death penalty does not contribute to reducing the level of criminality, which was best demonstrated in countries that abolished and re-introduced the death penalty, and the level of crime did not decrease or increased rapidly (7) the death penalty is a “final decision that has no possibility of correction” and if the error is subsequently established, if discovers that a person has been unjustly convicted, the “mistake” cannot be corrected, etc.

In the Republic of Serbia, the death penalty has not formally existed for 22 years, and it has not been carried out for 32 years. However, what is troubling is that more and more public opinion polls are emerging that show that most of the population is in favor of reintroducing the death penalty. Namely, due to the legal uncertainty that the population feels, due to events that appall the public, such a “mood” is formed in the public. During 2022, two years ago, research was conducted (Ipsos Strategic Marketing, 2022) in which 1,008 people were interviewed in 139 municipalities in the Republic of Serbia and as a result, 33% of respondents were against the reintroduction of the death penalty, and 67% of them were in favor of the reintroduction of the death penalty. Such understandings of society should be understood to some extent, because such an opinion in society arises precisely when society is faced with some major crimes for which citizens would prefer to apply “emergency judgment”. In the previous period, the Republic of Serbia was rocked by many tragedies (the mass murder of students in the “Vladislav Ribnikar” elementary school, the mass murder of very young people in Dubona and Malo Orašje, the mysterious disappearance of a two-year-old child, the kidnapping and rape of a minor girl, etc.) which led to such an understanding in society, and we also believe such results of the conducted survey. Despite this, it is good that there are no official initiatives for the reintroduction of the death penalty, and everything remains at the level of “optional conversations”, “desire of society caused by some unfortunate event”, “result of an unprecedented tragedy”, etc.

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CUSTOMER RELATIONSHIP MANAGEMENT (CRM) - A MODEL FOR IMPROVING THE MARKET PERFORMANCE OF COMPANIES IN THE TEXTILE INDUSTRY

Mina Mazic^{1*}, Zoran Ristic², Marijana Aleksic³

¹Academy of technical-art professional studies, School of Design, Technology and Management, Belgrade, Serbia,
e-mail: minapaunovic91@gmail.com

²Faculty of Organizational Studies EDUKA, University of the Academy of Commerce, Belgrade, Serbia,
e-mail: zoranris@yahoo.com

³Faculty of Business and Law, MB University, Belgrade, Serbia,
e-mail: marijana.aleksic@ppf.edu.rs



Abstract: Traditional business management models in the textile industry, based on supply and demand, are changing today. New opportunities on the market are not only based on reducing costs and increasing profits within a given business model, but the creation of completely new sources of income is oriented towards innovative models. Customer Relationship Management (CRM) is a relatively young model, which thanks to changes in management, modern information and communication technologies, strategic business planning and the penetration of personalized marketing, is increasingly developing in companies in the textile industry. This is the model on which the perspective and business of these companies depends, and the topic of this paper, in which the authors try to point out the importance of the CRM model for companies in the textile industry, achieving a higher degree of consumer satisfaction and loyalty, and additional value and better business results in the form of profit rates, faster rates of return on invested funds and other indicators of business excellence. At a time when markets are becoming saturated and competition is global, it is not easy for companies in the textile industry to attract, let alone retain, consumers. Consumers in the center of attention, greater concern and the development of long-term relations with them, become the essence, if the development and success of business in the textile industry is desired. CRM today represents one of the leading areas on which company management in the textile industry focuses, and it is predicted that it will be even more important in the coming period. Optimizing business activities/processes with the aim of increasing profitability through building, maintaining and improving a personalized relationship with consumers represents the basic philosophy of such management and a model for improving the market performance of companies in the textile industry, which is presented in the rest of this paper. Managing companies in the textile industry is becoming an increasingly demanding and demanding job, and the authors of this paper have a desire to point out the role and importance of the CRM model and provide useful guidelines for its further development, as a response to the ever more discerning tastes of consumers of textile products. The paper is expected to encourage the scientific and professional public to further research in this area and contribute to a better understanding of the importance of the CRM model in improving the market performance of companies in the textile industry and their facing challenges in an increasingly complex modern business environment.

Keywords: business excellence, competitiveness, market performance.

Field: Social Sciences and Humanities.

1. INTRODUCTION

Modern business brings a large number of challenges, especially business within labor-intensive and resource-intensive activities, which includes the textile industry, as one of the fastest growing branches of the economy (Dobrosavljević and Urošević, 2019, p. 36). We can notice ourselves that we are spending more and more money on clothes. Some of the brands in the textile industry have become symbols of our time. It is no longer enough to have the best and highest quality textile product, the best price, the best distribution network and the best promotion. The strategies of companies in the textile industry are based on what position the product has in relation to the direct competition on the market in the eyes of the consumer target group. In the new economy, the consumer is everything, while his perception of the product is what will decide whether it will fail or succeed in the market.

The concept of CRM has its roots in the 1960s and 1970s, when businesses began to shift their focus from the product to the consumer. Technological advances in the 1980s allowed businesses to record interactions with consumers and use that data for more targeted campaigns. In the 1990s, CRM software emerged as a response to the increasing need for a systemic approach to customer relationship

*Corresponding author: minapaunovic91@gmail.com



management, and in the 2000s, with the increasing impact of digitalization, CRM evolved into a more comprehensive system, integrating various business functions (Karr, 2023). As Kotler states, the new concept of customer relations is based on a new setting of the marketing mix - 4C, which actually explains how consumers view the 4Ps (product, price, promotion and distribution). The instruments of this new 4C concept become: Customer value - value for the consumer; Cost to the Customer - cost; Convenience - convenience for the consumer; Communication - communication between the seller and the buyer.

Increasingly complex modern business conditions and increasingly pronounced competition, globalization and internationalization require companies in the textile industry to find new, more effective and efficient ways of achieving business excellence in the markets. Consumer satisfaction and loyalty are gaining more and more importance and represent an important factor in their competitiveness. Along with the development of information and communication technologies and software for creating databases, the priority of the activities of these companies becomes two-way communication with consumers. Modern technology has influenced changes in business transactions from a product push strategy to a consumer pull strategy, that is, changes that result in a change in the position of the consumer in the value chain. The possibility of direct and targeted contact with them resulted in the personalization of relations, the formation of a database of consumers and the monitoring of their activity (Ristić and Damnjanović, 2021, p. 395). Today, numerous software solutions support the implementation of the CRM strategy in companies in the textile industry.

In order for companies in the textile industry to be relevant and to survive in an increasingly demanding market, they are forced to compete in a different way and to focus more and more on building stronger relationships with consumers, characterized by a partnership relationship rather than the classic law of supply and demand. Changes in the environment change the information and instruments available to companies in the textile industry. Growing importance is attached to creating and maintaining relationships with consumers through improving coordination, efficiency of marketing programs and providing greater value (Milenković and Ratković, 2009, p. 15). CRM techniques are used to realize various goals, from creating a company culture focused on customers, long-term relationships with them, to bringing profitability per customer to the highest possible level and engaging efforts and resources with the most profitable customers. Developing a CRM strategy implies a significant investment in terms of time that must be devoted to it, but which will certainly bring results in the long term. Creating a strategy allows the company to determine the direction in which it wants the management of relations with consumers to develop and to ensure the coordination of this business function with other functions and services in the company (Erste Bank, 2024).

The global CRM (CRM software revenue) market size is estimated at USD 65.59 billion in 2023 (USD 58.8 billion in 2022.) and is expected to grow at a substantial compound annual growth rate (CAGR) of 13, 9% from 2024. to 2030. Ongoing trends such as consumer hyper-personalization and use of modern information and communication technology are helping to reduce costs, increase response time, improve consumer satisfaction, and increase adoption of CRM platforms across industries and are major factors driving market growth (Grand View Research, 2024).

2. MATERIALS AND METHODS

The author's analysis in this paper included several significant scientific methods that led to reliable and applicable results. It covers the key trends, challenges and opportunities of applying the CRM model. The methods included primarily qualitative theoretical analysis, based on secondary sources of data, i.e. research that was conducted earlier and available literature in this area. More than 20 scientific and professional papers were analyzed, which had this topic as the focus of their research. In addition to bibliographic and causal theoretical methods in the analysis, inductive and deductive reasoning methods were also applied. This approach was chosen because it allows insights from different perspectives, summarizing and understanding the application of the CRM model in practice. The analysis aims to be critical and reflective, by pointing out the potential benefits of this model.

3. DEVELOPMENT OF THE CRM MODEL IN THE TEXTILE INDUSTRY

The textile industry implies a very specific production process that is composed of several stages and many operations, with frequent and necessary model changes and limited resources and capacities (Dimitrijević, 2021, p. 11). Companies in the textile industry strive to adapt their products as much as possible to consumers and by obtaining relevant information regarding their past purchases, demographic, psychographic and other characteristics and preferences, anticipate their needs. They try to build a high

degree of consumer loyalty by focusing on their preferences, as a basis for their good market performance (Milisavljević et al. 2009, p. 20). Thus, in the textile industry, the modern concept of management can be expressed as the achievement of corporate goals by satisfying the needs of customers better than the competition (Jobber and Fahy, 2006, p. 3).

The CRM model represents the harmonization of business strategies, organizational structure and company culture, based on information about consumers and information technology, with the aim of satisfying their needs in all contacts with consumers and achieving business benefit, i.e. profit, and the application of the CRM concept is a significant factor of competitive advantage (Hanic et al., 2011, p. 132). The CRM model implies a strategic management approach created by creating improved relationships in the marketing channel through developing appropriate relationships with key consumers and consumer segments (Payne and Frow, 2005, p. 169). It takes a lot of effort and time to establish, maintain and improve quality relationships with consumers. The evolution of relations with consumers can be presented as building trust in activities in the process of establishing contact, retaining attention and maintaining their loyalty.

CRM requires a business philosophy with a focus on the consumer and a business culture that supports effective marketing, sales and service processes, thereby integrating people, process and technology, in order to maximize relations with consumers (Vasiljev, S., Milovac Ilić, N., 2010, p. 151). CRM is defined differently, and the essence is formulating and implementing a business strategy that is focused on creating and maintaining long-term relationships with consumers. CRM can also be defined as an IT industry term that refers to the methodologies, strategies and software, and other web-based capabilities, that a business uses to organize and manage customer relationships. Analysis of the definitions that can be found in the relevant literature indicates that CRM is: (1) Business philosophy of the entire company; (2) A business strategy that is oriented towards establishing, creating, maintaining and improving long-term relationships with consumers; (3) Organizational culture that contributes to the creation of an appropriate climate for establishing a relationship of mutual respect and cooperation with consumers; (4) A set of methodologies that define the ways of establishing and maintaining the "best possible" relations with consumers and (5) A set of software solutions that provide support for the realization of managing relations with consumers.

In terms of strategy implementation, companies in the textile industry try to integrate communications and interactions with consumers through various channels, identify opportunities and chances for improvement, manage consumer value, etc. In these works, it is possible to identify four phases (Sigala, 2006, p. 209): (1) Construction of infrastructure and systems that enable the collection of information about consumers; (2) Development of management strategies for different segments, the goal of which is to bring profitability per consumer and consumer satisfaction to the highest possible level; (3) Understanding consumer value and controlling all possible adverse market impacts and maintaining consumer relationships and (4) Integrating strategic planning and managing consumer value.

The main role of the application of CRM tools in the textile industry is that they make the purchase decision to be made long before the act of exchanging goods and money. The decision to buy a product or not is made by prior positioning of the product in the consumer's mind. The term positioning first appeared in a series of articles called "The Era of Positioning" in the magazine "Advertising Age" in 1973. The authors of the articles, Al Ries and Jack Trout, published a book called "Positioning - Battle for your mind" right after that. The title page of that book also says: How to be heard and noticed in an oversaturated market (Ristić and Stanišić, 2021, p. 292).

It is becoming increasingly clear that companies in the textile industry can achieve their financial goals if they are able to build a special relationship with each individual consumer. This means a personalized relationship, a customized offer of price and payment terms, a customized distribution method, a customized product layout and user interface, as well as sales solutions. Offensive visibility and brand dominance were the main ideas of textile companies in the 1990s, but consumers in the new millennium expect more sensibility and honesty from these companies. In this sense, an approach based on emotional branding of textile products is becoming an important element that defines success in the market today. The concept of emotional branding is based on four dimensions (Filipović et al., 2003): (1) Proximity - It involves establishing as personal a contact as possible with consumers; (2) Sensory experiences - To permanently establish closeness that will create preference and loyalty to a product, it is necessary to offer the consumer a sensory experience associated with that product; (3) Imagination - An imaginative approach to product design, packaging, points of sale, advertisements and websites allows a product to win the hearts of consumers in a new way. (4) Vision - The most important factor in long-term success. All textile products go through a natural life cycle, and in order to create and preserve success in today's market, they must be positioned so that they can reinvent themselves.

CRM allows finding each consumer individually, studying and finding his target points based on his behavior (Jukić, 2022, p.1263). The personalization of mass production of products in the textile industry has the basic idea of increasing the variety of variations of the final product and conditionally speaking, expanding the range without drastically increasing production costs. The goal is to obtain a product intended for an individual under the conditions of mass production, that is, to realize the advantages of mass production and at the same time increase the number of potential consumers. Good examples of product personalization in the textile industry are Levi's ("Levi's Original Spin-Off" concept, where the consumer orders a garment according to his measurements) and Nike ("Choose it: Build it: buy it" concept, where the consumer is allowed to choose the size, color, and even the possibility of embroidery or personal name printing) (Novaković et al., 2010, p. 126).

Successful CRM development includes (Little and Marandi, 2003): (1) Forming a new market by selecting specific market segments and establishing a leadership position in those segments through the development of customized products; (2) Qualitative improvement of the level of relations with consumers on the selected market, by involving consumers in the process of designing and developing new products; (3) Implementation of monitoring and interpolation of trends in order to monitor changes in the environment and proactively react to them; (4) Development of the concept of partnership and long-term relations with consumers, suppliers and other market entities that can influence the successful market operations of the company.

4. DISCUSSIONS

The purpose of CRM is to enable more effective and efficient realization of company management goals in the textile industry, through an analytical assessment of the real needs of consumers. Although there are several commercial CRM software packages on the market, which support the CRM strategy and which managers can use, it is not a technology in itself, but rather a fundamental change in the organizational philosophy that emphasizes the customer. Those program packages ie. development of appropriate software and hardware, allow the CRM system to become largely automated, with the task of providing not only information, but also serving as a significant support for decision-making and analysis of the market situation. A successful CRM strategy cannot be implemented by simply installing and integrating a software package, and it cannot be implemented overnight. It includes top management policy, employee training, marketing systems, information management, etc. This means that all aspects of business must be shaped in accordance with the principles of CRM. Modern technology has left its mark in this segment as well, so that a large number of experts identify CRM with - call centers, interactive web portals, databases, datawarehousing and data mining solutions, software packages for sales automation. All this creates a "fog" that hides the old business truth that it is much easier to find products for people we know than to find people for products and services we understand. But modern technology alone is not enough for the successful implementation and functioning of CRM. Relying exclusively on technology and its possibilities, without a clearly defined business strategy and well-defined goals - what one wants to achieve, will not bring the desired results (Jukić, 2022, p. 1266). Of course, the reasons for the efforts of companies in the textile industry to build long-term relationships with consumers are not altruistic, but purely economic in nature. They simply want to keep existing consumers, because they start from the proven assumption that attracting new ones is more expensive than keeping existing ones. Establishing direct communication with consumers enables the personalization of relations with them and the offer of additional value, which they often reward with long-term loyalty (Mitrović, 2016).

Most companies in the textile industry spend more resources attracting new customers than retaining existing ones - which is generally wrong. The cost of attracting new customers is typically five times higher than the cost of retaining existing customers. On the other hand, attracting and retaining consumers is only part of the task. In the textile industry, one must also strive to increase the amount of goods purchased by each consumer. In addition to increased purchases, satisfied consumers recommend websites, stores and products to their friends. Word-of-mouth communication among consumers is the "heart" of CRM. There are two key questions in this model: 1. How to recognize consumer needs? 2. In which consumers does it make sense to invest? The answer to the first question was given by the ancient Greek philosopher Epictetus, who said that God gave man two ears and one mouth so that we would listen twice as much as we speak. If companies in the textile industry listen carefully, consumers will say what and when they want something. In assessing whether what we heard really has value, Abraham Maslow's hierarchy of needs is very helpful, which will show how to send a precise message to the consumer that is impossible to refuse. When a customer accepts an offer, it is just the beginning of building a long-term relationship with him. What he wants today may not be wanted tomorrow. It is necessary to know what

they want as soon as it changes, or, even better, to assume it. The second question was answered by Vilfredo Pareto (rule 80:20). In addition, studies conducted by the Manhattan Consulting Group show that 20% of consumers create 150% of profits, and 40% of consumers eliminate even 50% of profits (Ristić and Damjanović, 2021, p. 398).

The effects of the introduction of CRM, indicated by some of the most important authors in this field, can be multiple: (1) More effective segmentation of target consumer groups; (2) Analytical forecasting of market trends; (3) Faster reaction to market changes, (4) Analysis of profitability of individual consumers; (5) Ability to direct the offer to highly profitable consumers, (6) Improvement of service quality and sales opportunities; (7) Longer consumer retention; (8) Shorter sales cycle and higher profitability of the sales process, (9) Synchronization and analytical processing of information collected from different sources; (10) Improvement of business efficiency and flexibility (11) More intensive development of the company's competitive advantage and reputation as a strong business partner (Hanic et al. 2011, p. 143).

Consumers believe that by buying a textile product, they are showing who they are and what they are like. That is why they often give, at first glance, an unreasonable amount of money for a specific product. The explanation of this "extravagance" and conditional irrationality lies in the fact that human choices are based on emotions. The prerequisites for the successful implementation of the CRM concept are, first of all: good knowledge of the field of business and competition; consumer knowledge; market way of thinking; the operation of the company as a whole - an integrated approach to the management of communication and sales channels, as well as the development of a database (Payne and Frow, 2005, pp. 167-176). Permanent changes in the market require everyone, especially companies in the textile industry, to have flexible strategies that can amortize sudden changes in consumer demands. In conditions of increasing competition, it is necessary to use all available potentials to enable survival and development (Paunović, 2017, p. 9).

5. CONCLUSIONS

The introduction of CRM in companies in the textile industry is an investment in the future, so it must be started from a planned long-term approach. It is especially important for those companies that can sell many different products to the same consumer, where valuable products quickly become obsolete, or are constantly improved under the pressure of competition. CRM is a condition "sine qua non" for those companies that have VIP consumers and need to know a lot about them, as well as those companies that routinely collect a large amount of data about them for their marketing activities. The ROI of a CRM software system, when properly implemented, can exceed 245%, and 74% of businesses say that CRM technology provides better access to customer data (Tech.co, 2024). However, in 2023, according to the data of the Republic of Serbia Statistical Office, only 10.7% of all companies in Serbia used a CRM system to analyze customer information (RZS, 2023, p. 81). The textile industry in Serbia is very important after privatization in the arrival of large companies to this market (such as Benetton, Calzedonia, Golden Lady, Pompea and others), and its future development should be viewed in the context of reindustrialization and balanced regional development (Bukvić and Petrović, 2022). This must be carefully planned and implemented, and new approaches by companies in managing relationships with consumers are certainly necessary.

Several basic key points today determine the operations of companies in the textile industry, as well as the behavior of their consumers: (1) The consumer is no longer "king", he becomes a "dictator" who dictates the ways of realizing the company's entire business processes; (2) Mass production gives way to mass personalization, as consumers demand products that fully meet their requirements and needs; (3) Digitization breaks all time and location boundaries, so these companies can sell their products all over the world; (4) The CRM model requires a holistic approach, because companies must analyze all aspects of interactivity with consumers and, based on that, determine strategic development directions; (5) Business cycles in the textile industry are drastically shortened because the needs and demands of consumers are changing rapidly, so a quick and flexible reaction to new conditions is necessary; (7) New types of software solutions and tools are launched. The software tools of the future should respond to new organizational requirements that impose the need to manage the entire process (Đorđević, 2014).

CRM tools should provide access to information that targets the needs and desires of consumers in the textile industry. When this information is collected and placed in the appropriate context (database), these companies should turn the results of the conducted market analyzes into new business opportunities that will be realized, and thus contribute to the growth of profitability. Another important way CRM tools influence profitability growth is by increasing productivity by streamlining complex business processes. The links between pre-sales and post-sales activities are often intertwined, so the direction and traceability of

comprehensive operations is a source of significant savings. The most effective way in which companies in the textile industry can adapt to changes in the market and economic situation is to understand, fully implement and continuously innovate and improve the business concept of market performance.

In most cases, the characteristic of successful enterprises in the textile industry is the long, often multi-decade, implementation of a well-planned strategy. Today, such strategies increasingly rely on emotional connection with consumers and their daily lives. Products can only be accepted when they establish an emotional dialogue with consumers. Bearing in mind this new paradigm driven by emotions, it can be concluded that consumers, when choosing a textile product, think more with their heart than with their head and that people want companies to convince them that they are unequivocally committed to them. At a time when most textile products have a similar quality, they are exposed to the danger of turning into ordinary goods in an oversaturated market, so a largely unexplored area of emotions is increasingly associated with shopping habits. Today, in the world of the textile industry, one can observe a tendency to use more and more psychological terms, and less statistical formulas and graphs. The most frequently used words in contemporary literature in this area are: "positive reaction", "emotion", "feeling"; rather than "product", "price", "quality" and the like.

Successful companies in the textile industry long ago recognized the transition from the product market to the customer market and implemented new software solutions in their business processes and systems. Production has ceased to be mass, and consumers have raised the threshold of their tolerance and selection criteria. When a company wants to introduce CRM in its business, it needs to keep in mind that every organization is unique and has its own specific business model. CRM tools can differ significantly in the functions and features they offer and not all have the same effects in companies in the textile industry. Without information about the needs and motives of consumers, their purchasing behavior and the factors affecting the purchasing process, one cannot imagine the success of a company in the textile industry. CRM combines potential relationship marketing strategies and modern technology to create a profitable, long-term relationship with consumers. The customer relationship management process requires the integration of processes, people and operations, ie. implementation of relationship management through information, technologies and applications. Information about what consumers buy, where, when and how, why they buy, is the starting point for production planning in the textile industry. In the textile industry, efforts and resources must be directed to understanding the needs of consumers, in order to increase the company's ability to gain an advantage over the competition. Consumers believe that by buying a textile product, they are showing who they are and what they are like. That is why they often give, at first glance, an unreasonable amount of money for a specific product. The explanation of this "extravagance" and conditional irrationality lies in the fact that human choices are based on emotions.

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SECURITY MANAGEMENT OF THE ITALIAN REPUBLIC IN THE CONTEMPORARY SECURITY ENVIRONMENT

Vladan Mirković^{1*}

¹University in Novi Sad, Faculty of Law in Novi Sad, Republic of Serbia,
e-mail: v.mirkovic@pf.uns.ac.rs



Abstract: The main features of the Western contemporary security discourse for the past two decades have been hybrid threats as threats to national security and an integrated approach as a way of ensuring the national security. Italy is the only G7 state that does not have a national security strategy. Nevertheless, its security policy is harmonized with NATO, the EU and the leading Western states. Italy recognized the danger of hybrid threats and since 2007 it has undertaken a series of reforms which led to vertical and horizontal integration in crucial executive departments in the field of national security. Through these reforms, Italian security architecture adapted to modern security challenges. On the basis of legal acts, it achieved the vertical integration of departments and bodies competent for external and internal security, intelligence and cyber security, while the horizontal integration was achieved through the existence of collective bodies at the strategic, coordinating and operational level. Thus, the object of this research was the Italian security system in the contemporary security environment with a special reference to the place and role of Italian security management. In that sense, this research aims to answer the following questions: Is Italian security policy aligned with NATO and the EU security policies in terms of hybrid threats and integrated approach? Does Italy meet the organizational and functional conditions for the integrated approach?

Keywords: Integrated Approach, Hybrid Threats, Security Management, the Italian Republic.

Field: Social sciences (Security Studies).

1. INTRODUCTION

Hybrid threats have occupied the security and political discourse of NATO and the EU for the past two decades. Numerous security acts brought by NATO, the EU and leading Western countries testify to that. At the same time, an integrated approach to security is seen as the most effective way to ensure national security in a contemporary security environment. Italy is the only G7 state which does not have a national security strategy. However, being a member of NATO and the EU it had to align its security policy with their security policies. Hence, the scientific problems of this research were defined through the following questions:

1. Is Italian security policy aligned with NATO and the EU security policy in terms of hybrid threats and integrated approach?

2. Does Italy meet the organizational and functional conditions for the integrated approach?

The hypothesis of research is that despite the absence of a national security strategy, Italian security policy is aligned with the security policy of NATO and the EU on key security issues. Furthermore, Italy integrated activities in crucial executive departments while at the strategic level, it has the Supreme Council of Defence (the Council) as a body within which the existing constitutional and political order has the ability to influence the enforcement of the integrated security policy on the horizontal and vertical axis. The scientific goal of research is to provide a scientific description and explanation of the Italian approach to national security and to analyze the capability of its security system to enforce it with special reference to security management.

2. ITALY AND CONTEMPORARY SECURITY POLICIES

Comparative analysis of the security policy of NATO, EU and some leading NATO states resulted in a finding that hybrid threats are identified as one of the major contemporary security threats. "A key characteristic of hybrid warfare is merging activities from all domains of society into a single activity (functional integration), managing it from one centre (organizational integration) and its direction towards a single goal" (Mirković, 2021). In other words, hybrid warfare (threats, tactics) "implies the integration of all resources of national power, thus achieving a new quality through a synergetic effect (Hoffman, 2007, 2009, 2018; Korybko, 2015; D'Agostino, 2010)" (Mirković, 2024, p. 90). Research further showed that "the understanding of hybrid warfare has evolved over time from Walker's thesis about an efficient way

*Corresponding author: v.mirkovic@pf.uns.ac.rs



of warfare by specially trained and prepared units to the state's actions which are carried out through a network of state bodies and non-state actors" (Mirković, 2023, p. 59). A hybrid-related concept is present in Italian security policy. The White Paper on International Security and Defence (Libro Bianco) tackled hybrid threats from a purely military point of view (Libro Bianco, 2015, p. 47). Nevertheless, the position of the Council which stated that in countering hybrid threats a "joint effort of the country system is essential" ("The Presidency of the Republic", 2023) implies a wider understanding of hybrid threats.

The integrated nature of hybrid threats dictates the integrated approach as the only suitable one for ensuring national security. The integrated approach encompasses the usage of all aspects of national power and it is known as a Whole of Society (WoS) or Whole of Government (WoG) approach. Through the integration of activities from all societal domains, this approach produces societal resiliency as "the desired product of a well-functioning WoS approach in countering complex and interconnected dangers such as hybrid threats" (Wigell, Mikkola & Juntunen 2021, p. 2). "The Joint Research Centre (JRC) and the European Centre of Excellence for Countering Hybrid Threats (Hybrid CoE) worked out the Comprehensive Resilience Ecosystem (CORE). Basic idea is developing resilience of the society through the interconnection between 13 domains (military, diplomacy, intelligence, economy, cyber etc.) in which actors use tools against hybrid activities in order to protect seven foundations of democratic society. CORE can promote cross-sectoral, whole-of-society effort by taking stock of the crucial interlinkages between issues often addressed separately" (Mirković, 2023, p. 59).

In order to strengthen internal and external security, the Council of EU in 2015 initiated creating a joint framework to help "countering hybrid threats and foster the resilience" (Council of the European Union, 2015, p. 3). "Joint Framework on countering hybrid threats encouraged a whole-of-government approach, with 22 areas for action, to help counter hybrid threats and foster the resilience of the EU and the Member States" (European Commission, 2018, p. 3). It enabled a holistic approach to countering "threats of a hybrid nature by creating synergies between all relevant instruments" (European Commission, 2016, p. 3). "In March 2022, the Council of the EU presented the Strategic Compass for Security and Defence in which it announced the establishment of the EU Hybrid Toolbox which should bring together all civilian and military instruments which are suitable for countering hybrid threats. In the Strategic Concept (2020), NATO announced the enhancement of global awareness and readiness to act across all domains and directions using military and non-military tools in a proportionate, coherent and integrated way to respond to all threats" (Mirković, 2024, p. 90). In 2021, the United Kingdom officially accepted the Fusion Doctrine in their national security strategy, as the new approach to national security. In October 2022, the US introduced Integrated Deterrence as an approach to national security (National Security Strategy-NSS, 2022). In 2023, Germany accepted Integrated Security in the National Security Strategy – Integrated Security for Germany.

Although Italy does not have a national security strategy the ideas of integration and resiliency are present in its security policy. The Council stated that "defence and security must be considered as a common objective for the institutions of the Republic, based on a national security strategy developed by the Government and endorsed by the Parliament" ("Ministry of Defence - Supreme Defence Council", 2023), since new threats, including hybrid ones, require a more effective national security architecture which requires a joint effort of the country system. This joint effort is seen through the integration into crucial executive departments. Firstly, a new model of governance and internal organization of the Ministry of Defence was introduced where the Chief of Defence Staff is the head of the entire military personnel while the Deputy Chief of Defence Staff is the Commander of the Joint Command as the only operational military command. Furthermore, Libro Bianco insists on the multiplicity of fields of action which includes "the use of all available state instruments, including the military one" (Libro Bianco, 2015, p. 19). Secondly, Decree-Law 2017, No. 14 allowed the participation of local authorities and citizens in public policies related to public order and security (integrated security). Integrated security is pursued by the State, Regions and local authorities, each within their own competencies, through agreements and pacts (Giupponi, 2022, p. 9-10) with the Ministry of Interior as the supreme supervisory authority. All the arrangements should be in accordance with the guidelines which are adopted by the Unified Conference (coordinating body chaired by the President of the Council of Ministers) on the proposal of the Minister of the Interior (Decree-Law 2017, No. 14, Ar. 1). Thirdly, since 2007, the entire civil intelligence activities were integrated and subordinated directly to the President of the CoM (Law 2007, No. 124). Lastly, in 2021, all duties in cyber security were entrusted to the newly founded National Cybersecurity Agency (NCA) which is responsible directly to the President of the CoM (Decree-Law 2021, No. 82).

Integration in the most important Italian executive departments related to national security exists due to the reforms which started in 2007 with Law 2007, No. 124. Nevertheless, "it would be convenient to draw up a single document to describe a National Security Strategy" (Marta & Camillo, 2009, p. 17).

"The development of the first Italian National Security Strategy was indicated as a necessity both in the debate in Parliament and in the 2024 Guideline of the Ministry of Defense" (Mazziotti & Cotichia, 2023) and in the previously mentioned Council's statement. Thus, the integral national security strategy would become a framework for sector strategies and laws that enable the implementation of the integrated strategy's goals. An equally important effect of presenting a national security strategy would be spreading the awareness of the need for an integral approach among all the members of the Government, which is the cornerstone of such an approach.

3. SECURITY MANAGEMENT OF THE ITALIAN REPUBLIC

3.1. THE STRATEGIC LEVEL OF ITALIAN SECURITY MANAGEMENT

The President of the Republic and the Council of Ministers constitute the Italian security management at the strategic level. "The President of the Republic is the Head of the State and represents national unity" (Constitution, Ar. 87). As the Head of the State, the President is the commander-in-chief of the armed forces, presides over the Council and the High Council of the Judiciary, issues decrees which carry the force of law, has the right to declare war, and appoints the President of the CoM, the Ministers (Constitution, Ar. 92) and civil and military servants. The President acquires detailed information on the Government's orientations in security and defence matters through the Council which "examines general political and technical problems relating to national defense and determines the criteria and establishes the directives for the organization and coordination of activities that concern it" (Decree-Law 2010, No. 66, Art. 2). Without executive powers, the Council is the place which brings together the highest political representatives to discuss the national security issues. This enables a synergetic approach to solving problems. The membership of the Council is constituted in a manner which provides the President with all the necessary information on the issues of national security. The President of the CoM is responsible for government policy, particularly for intelligence and cyber policy. The Minister of Defence and the Chief of the Defence Staff are responsible for external security, and the Minister of the Interior is in charge of internal security. The Minister of Foreign Affairs is responsible for international policy and the coordination of government bodies with the country's international policy objectives. The Minister of Economy and Finance is superior to the Financial Intelligence Unit for Italy (Decree-Law 2010, n. 66, Art. 3).

"The Government of the Republic is made up of the President of the CoM and the Ministers who together form the Council of Ministers" - CoM (Constitution, Ar. 92). "The President of the CoM conducts and holds responsibility for the general policy of the Government and ensures the coherence of political and administrative policies, by promoting and coordinating the activity of the Ministers" (Constitution, Ar. 95). Intelligence and cybersecurity matters are centralized and under the direct control of the President of the CoM who can delegate the functions that are not exclusively attributed to him only to a Minister without portfolio or to an Undersecretary of State (Delegated Authority) (Law 2007, No. 124, Ar. 3; Decree-Law 2021, No. 82, Ar. 4). In performing its functions, the President of the CoM is assisted by the Interministerial Committee for the Security of the Republic (CISR) or the Interministerial Committee for Cybersecurity (CIC).

CISR has the function to advise, propose and discuss the guidelines and general purposes of the intelligence policy. It is chaired by the President of the CoM and consists of the "Delegated Authority, the Minister of Foreign Affairs, the Minister of the Interior, the Minister of Defence, the Minister of Justice and the Minister of Economy and Finance" (Law 2007, No. 124, Ar. 5). The centralisation of intelligence policy and the CSIR's guidelines enable harmonized intelligence activities which produce a single intelligence basis for decision-making. This also ensures the rational usage of intelligence resources and better coordination of all the elements of the intelligence community. Although the military intelligence service (RIS) is not a part of the Intelligence system, through membership of the Minister of Defence in CSIR, CSIR's guidelines could become a framework for military intelligence.

CIC has advisory and supervisory functions in the field of cybersecurity policies. It proposes the general guidelines and framework for national cybersecurity policy to the President of the CoM, "exercises high surveillance on the implementation of the national cybersecurity strategy and promotes the adoption of the necessary initiatives to foster effective collaboration at the national and international level" (NCA – Implementation Plan, 2022, p. 42). CIC is chaired by the President of the CoM and other permanent members are "Delegated Authority, the Minister of Foreign Affairs, the Minister of the Interior, the Minister of Justice, the Minister of Defence, the Minister of the Economy and Finance, the Minister for Economic Development, the Minister of Ecological Transition, the Minister of University and Research, the Minister for Technological Innovation and the Digital Transition and the Minister of Infrastructure and Mobility" (Decree-Law 2021, No. 82, Art. 4).

3.2. COORDINATING LEVEL OF THE ITALIAN SECURITY MANAGEMENT

The coordinating management is composed of a network of managers whose tasks are to organize, coordinate and control the enforcement of the strategic objectives in a particular administrative area. The Secretary of the Council collects and processes all the information related to competencies of the Council and coordinates the implementation of the relevant resolutions and directives by the competent bodies. The Secretary is assisted in performing his duties by the Secretariat Office, which consists of military and civilian personnel (Decree-Law 2010, No. 66, Art. 6 – 7).

The Ministry of Foreign Affairs and International Cooperation is entrusted with the tasks pertaining to “political, economic, social, and cultural relations with foreign countries and international organizations” (Decree-Law 1990, No. 300, Ar. 12). The Ministry operates through a network of embassies, permanent missions to the international organisations, special diplomatic delegations, consular offices, and Italian cultural institutes in order to promote the Italian interests in the international arena. The Minister is obliged to coordinate the activity of this network and to ensure that the international activities of other Italian “ministries and government offices are consistent with the country’s international policy objectives” (“Home - The Ministry of Foreign Affairs and International Cooperation”, 2024). The Ministry of Defence is responsible for the military defence and security of the Republic. It is directed by the Minister of Defence who is superior to military and civil administration (Decree-Law 2010, No. 66, Art. 10, 15). “The Minister of Economy and Finance is responsible for policies for the prevention of money laundering and financing of terrorism. In order to implement these policies, the Ministry of Economy and Finance fosters cooperation between the Financial Intelligence Unit for Italy (UIFI), the sectoral supervisory authorities, professional bodies and the police forces, and also between public and private sector bodies” (“Financial Intelligence Unit”, 2024).

The Minister of the Interior is responsible for the protection of public order and security, civil defence, civil protection policies and fire prevention, the protection of civil rights, citizenship, immigration, asylum and public aid, and the regular establishment and functioning of local authorities, as well as exercising state’s functions through local authorities (Decree-Law 1999, No. 300, Ar. 14). As a national public security authority, the Minister coordinates the activities of the police forces with the assistance of the Public Security Administration (Law 1981, No. 121, Ar. 1, 2). The Italian police forces are the State Police, the Carabinieri, Financial Police, Coast Guard, Prison Police and State Forestry Corps at the State level and the provincial and local police. The Minister chairs the National Committee for Public Order and Security as an auxiliary advising body which is composed of an “Undersecretary of State for the Interior, acting as Vice-President, the Chief of Police-Director General of Public Security, the Commander General of the Carabinieri and the Commander General of the Financial Police” (Law 1981, No. 121, Ar. 18).

The Presidency of the Council of Ministers is an office managed by the Secretary-General which provides the President of the CoM with the technical, advisory and legal support. This office has a complex structure which includes the Department of Security Information (DIS) which is governed by the Director-General, also who serves as the CISR’s secretary. The DIS coordinates the entire civil intelligence; exercises control over the AISE and the AISI; informs the President of the CoM of the operations of the intelligence services; collects the information, analyses and reports from the AISE and the AISI, the Armed Forces and the Police Forces, the State administrations and also from private research bodies; promotes and guarantees the exchange of information between the AISE, the AISI and the police forces, etc. (Law 2007, No. 124, Art. 4). The President of the CoM uses the DIS for the exercise of his competencies in order to ensure full unity in planning and performing activities by the intelligence services.

NCA was established to protect national interests in the field of cybersecurity (Decree-Law 2021, No. 82, Art. 5). The Director General is appointed by the President of the CoM and also serves as the secretary of the CIC. The NCA operates in synergy with other executive departments. “In this context, the intelligence sector (the DIS in particular) is called upon to provide the NCA with useful information...” (Matassa, 2023, p. 644-645) along with the Ministry of the Interior and the Ministry of Defence. National CyberSecurity Cell (Nucleo per la cybersicurezza - NCS) is established within the NCA in order to support the President of the CoM and to enable better coordination with other services. The periodic meetings of the NCS have enabled “inter-institutional coordination at the technical-operational level amongst the various administrations involved” (NCA – 2023 Year in Review, p. 14). Furthermore, the NCA is the Italian National Coordination Centre established in each EU Member State for the purposes of the European Cybersecurity Competence Centre (ECCC).

3.3. OPERATIONAL LEVEL OF THE ITALIAN SECURITY MANAGEMENT

Managers at the operational level are obliged to enforce strategic goals and priorities. The Chief of Defence Staff is the highest military position and he is responsible to the Minister of Defence. He is

appointed by the decree of the President of the Republic, after the deliberation of the Council of Ministers, on the proposal of the Minister of Defence. He is superior to the Chiefs of Staff of Armed Forces (the Army, the Navy and the Air Force), to the Commander of the Joint Command and the Commander General of the Carabinieri, limited to the military tasks. The Commander of the Joint Command is Deputy Chief of Defence Staff in charge of operations which is appointed by the decree of the President of the Republic, after the deliberation of the Council of Ministers, on the proposal of the Minister of Defence (Decree-Law 2010, No. 66, Art. 25, 29). The Carabinieri have an autonomous position within the Ministry of Defence, with the rank of Armed Forces. It is a military police force with general competency and public security service with the special prerogatives conferred by the current legislation (Decree-Law 2010, No. 66, Art. 90, 155-157, 160).

The Intelligence system of the Italian Republic is headed by the President of the CoM and it is composed of the CISR, the Delegated Authority, the DIS, the foreign intelligence service - AISE, and the interior intelligence service - AISI (Law 2007, No. 124, Art. 2). The Italian intelligence community is composed of civil and military intelligence services and several civil agencies. AISE and AISI are civil security services which are established by Law 2007, No. 124. AISE is entrusted with the task of collecting the information about threats to “the independence, integrity and security of the Republic” from abroad and it “may carry out operations on the national territory only in collaboration with the AISI” (Law 2007, No. 124, Ar. 6). AISI is responsible for information collection “within the national territory in order to protect the political, military, economic, scientific and industrial interests of Italy” (Law 2007, No. 124, Ar. 7). The President of the CoM appoints and dismisses, after consulting the CISR, the Directors of the AISE and the AISI. Financial Intelligence Unit (UIFI) is part of the intelligence community and it was established within the Central Bank of Italy (Banca D’Italia). As a central national agency, the UIFI works in collaboration with the Financial Police on the collection of information on potential cases of money laundering and financing of terrorism (“Financial Intelligence Unit”, 2024). Military intelligence service – RIS is the staff element of the Defence General Staff which carries out tasks exclusively related to the military and military police. The RIS acts in close liaison with the AISE according to rules approved by decree of the President of the CoM, issued after deliberation of the CISR (Decree-Law 2010, No. 66, Art. 30). The Joint Military Intelligence Centre (CII) operates within the RIS and integrates intelligence efforts across the Armed Forces in order to enhance joint operational effectiveness (Verneti, 2024). Computer Security Incident Response Team – Italia (CSIRT Italia) is a technical-operational structure within the NCA which deals with cyber incidents (“CSIRT”, 2024).

Police duties are performed by the Public Security Administration, which is a general term for a massive and multilevel police network which reflects the regional character of the Republic. At the top of this network is the Department of Public Security as a central authority who is responsible for the implementation of the policy of public order and security and the direction of the State Police. “The Department is headed by the Chief of Police – Director General of Public Security, appointed by the decree of the President of the Republic, after deliberation by the CoM, on the proposal of the Minister of the Interior” (Law 1981, No. 78, Art. 5). The same procedures are made for the Commander General of the Carabinieri and the Commander General of the Financial Police. The Prefect is the provincial public security authority that performs all functions and duties of the Ministry of the Interior, at a provincial level, which are not delegated to other bodies. The Provincial Committee for Public Order and Safety is established as an auxiliary body advising the Prefect in the exercise of his powers. The Quaestor is the head of police headquarters in the province (Questura) and thus he represents the provincial public security authority which operates at the technical operational level and also serves as the local public security authority for the province capitals. The police commissioners are local public authorities responsible for the police stations which are established outside of the province’s capital, in small municipalities and districts of cities. Where police stations are not established, the powers of local public security authority are exercised by the mayor as a government official. The police commissioner and the provincial commanders of the Carabinieri and the Financial Police have to inform the Prefect and the Quaestor on everything that has to do with public order and security in the province (Law 1981, No. 121, Art. 13, 14, 16, 20).

4. CONCLUSION

Italy is the only G7 state that does not have a national security strategy. Nevertheless, research showed that its security policy is harmonized with NATO, the EU and the leading Western states. Italy has undertaken a series of reforms since 2007 in order to adapt its security system to security challenges. Through Law 2007, No. 124, the Intelligence system was founded, intelligence agencies were reorganized and all civil intelligence activities were centralized and subordinated to the President of the CoM. In the

same manner, with the Decree-Law 2021, No. 82, the entire cyber security activities were vested to NCA, which is directly subordinated to the President of the CoM. The reforms in military affairs (Decree-Law 2010, No. 66) resulted in the changes in the chain of command. The President of the Republic is the commander-in-chief of the armed forces, followed by the Minister of Defence, the Chief of Defence Staff and the Commander of the ISOC. The Council serves as the President's headquarters through which he acquires all relevant information on national security.

The Ministry of the Interior experienced many reforms in order to adjust its structure to the specific character of the regional state and the security environment. The Minister is at the top of the organization of the Ministry. Public order and internal security are enforced by the Public Security Administration, which is a multilevel structure composed of the Department of Public Security at the State level, the Prefect and Questores as provincial public security authorities and the police commissioners as the local public security authorities. At every level, there are the organizational units of the police forces which are subordinated to the public security authorities. Although the Republic has exclusive competencies in the field of public order and internal security with the exception of local administrative police, Decree-Law 2017, No. 14 allowed the participation of local authorities and citizens in public policies related to public order and security. This means that based on the arrangements which are in accordance with the guidelines for the promotion of integrated security, the provincial and local police forces can perform duties related to public order and security. These guidelines are adopted by the Unified Conference on the proposal of the Minister of the Interior.

In the four mentioned domains, collective bodies (the Council, Unified Conference, CSIR and CIC) were established as advisory and supervisory authorities whose members are the heads of the most important executive departments. This facilitates the horizontal integration at the strategic level and it also enables the managers at the coordination level to enforce duties in their competence through an integrated structure of their departments in a synergetic and coordinated manner. Horizontal integration is also facilitated through the existence of collective bodies at the coordination and operational level with similar functions as CSIR and CIC.

To sum up, it can be stated that the research provides answers to all questions identified in the introduction. However, the basic hypothesis was only partially confirmed. The place and role of the Council within the security system are not different from the role of the CSIR or CIC. Moreover, CSIR and CIC seem to have more executive power than the Council. Nevertheless, the security system of the Italian Republic is well structured and governed while the collective bodies with the advisory and supervisory authority at the strategic, coordination and operational levels facilitate performing national security objectives in a synergetic and coordinated manner.

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THE MEDIATING EFFECT OF INNOVATIVE WORK BEHAVIOUR ON THE ASSOCIATION BETWEEN WORK-RELATED STRESS AND JOB PERFORMANCE OF AGRICULTURE RESEARCHERS

Matthew Olalekan Oose^{1*}, Olufunmilola Oyinade Adenuga¹, Oyeronke Adenike Adekola¹, Stephen Oluwaseun Adeogun¹

¹Federal University of Agriculture, Abeokuta, Nigeria, e-mail: oosemo@funaab.edu.ng, adenugaoo@funaab.edu.ng, adekolaoa@funaab.edu.ng, adeogunso@funaab.edu.ng



Abstract: Employees who demonstrate Innovative Behaviour in the workplace are often more adaptable and this helps mitigate the impact of Work-Related Stress and enhances Job Performance. The study assessed the mediating effect of Innovative Behaviour on Work-Related Stress and job performance of agriculture researchers in Southwest, Nigeria. A simple random sampling technique was used to select Two Hundred and Sixty-One (261) agriculture researchers for the study. Results indicate that 52.2% of the researchers were male, and 59.4% were married, with an average age of 43 years and 10 years of experience. Increased workload (Weighted Mean Score = 264.3) and poor working conditions (WMS = 248.1) were the predominant Work-Related Stress in the study area. The hierarchical regression analysis revealed a significant ($p < 0.05$) relationship between Work-Related Stress and job performance ($b = 5.38$, $p < 0.01$). Also, In-B was significant ($b = 0.16$, $p < 0.05$) to job performance. The study concluded that despite the prevalence and the influence of Work-Related Stress on job performance, Innovative Behaviour which serves as a mediating variable helped mitigate the impact of Work-Related Stress as employees approach their task in different ways, reducing the likelihood of feeling overwhelmed. The study recommended continuous learning and skill development to enhance researchers' capabilities to cope with job demands and adapt to changes in the organization.

Keywords: Innovative behavior, stress, job performance, Agriculture Researchers

Field: Humanities

1. INTRODUCTION

Work-related stress is an inescapable aspect of employees' daily activities and its presence within the organization, in particular, poses a formidable obstacle to many employees in carrying out their responsibilities (Amankwah, 2023) and also causes problems for employees and the organization (Wang et al., 2022). Stress is proclaimed to be a common factor that employees all across the world experience regularly. It is the deadliest silent killer of an employee, particularly during times of depression (Syed et al., 2012). Stressed employees are more likely to be ill, unmotivated, underproductive, and insecure at work, hence a reduction in their job performance (Josh and Goyal 2013).

According to Bui, et al (2021), the relationship between work-related stress and job performance is bidirectional, perceived pressure can be useful to keep employees alert, motivated, and able to work, but when it exceeds a certain threshold which varies among employees, it becomes excessive, causing stress. Therefore, work-related such as poor work conditions, excessive workload, unclear work schedules, long working hours, and lack of management support among others can be mitigated by working innovatively in the workplace (Karam and Kovess-Masfety 2022). According to Kmiecik (2020), innovative workplace behaviour is a stage of behaviour to intentionally create, introduce, and implement new ideas within the scope of work roles, groups, or organizations. It is an important variable in resolving work-related stress and enhancing job performance. In addition, innovative behavior fosters proactive problem-solving, which can create a more positive work environment. By encouraging new ideas and approaches, employees may feel a greater sense of autonomy and control, which can help alleviate the stress associated with rigid or unyielding work structures. The study, therefore, assessed the mediating effect of innovative work behavior on the relationship between work-related stress and job performance of agriculture researchers in Southwest, Nigeria.

2. MATERIAL AND METHOD

This study was conducted in three (3) selected agricultural research institutes namely Forestry Research Institutes of Nigeria (FRIN), Institutes of Agricultural Research & Training (IAR&T), and National Horticultural Research Institutes (NIHORT). The research institutes were purposively selected based on

*Corresponding author: oosemo@funaab.edu.ng



their agricultural-related mandate, and being a federal-owned research institutes domiciled in Southwest, Nigeria. A simple selection of two hundred, and sixty-one (261) respondents was made (93 at FRIN, 98 from IAR&T, and 70 from NIHORT) and the total retrieved percentage of the questionnaire was 91.9% (n=261; N=285). Since over 75.0% response rate was recorded, the nonresponse mistake is not a problem to the study's correctness. A validated and pre-tested instrument was used to collect information from the respondents. The age of the respondents and years of experience at work was determined by collecting the actual numbers in years; gender and marital status were measured at the nominal while educational status was measured at the ordinal level. An items scale developed by Frantz and Holmgren (2019) was used to measure the causes of work-related stress. Fourteen-item construct of innovative work behavior by Jeroen and Deanne (2010) was adapted while job performance was measured using a 15-item scale developed by Sarasvathy (2013) and adapted by Oose et al., (2022).

The mediational analysis was achieved using the hierarchical regression analytical technique. A four-step procedure by Preacher and Leonardelli (2001) was adopted to test for the mediation. In stage one, the predictor should significantly relate to the mediator, in the second stage, there should be a significant relationship between the predictor and criterion in the absence of the mediator while the mediator should have a significant relationship with the criterion in stage three and finally, the magnitude of relationship between predictor and criterion should become non-significant or reduced upon the inclusion of mediator to the model to provide evidence for full or partial mediation. The objectives were ascertained using frequency, percentage values, and Mean Score (i.e. weighted). The significant difference (that is, the Pearson value) was determined at 5% or 1% significant level.

3. RESULTS AND DISCUSSION

The mean age of the respondents was 42 years with 37.2% of them within the ages of less than or equal to 30 years while 34.5% of the respondents were within the ages of 31 and 40 years (Table 1). This implies that agricultural research institutes in Nigeria are predominantly occupied with middle-aged employees between the ages of 40 and 45. It also connotes that these employees are young, youthful at heart, and energetic. It is expected that with this set of employees, they will bring several benefits to the organization. Their fresh perspectives and familiarity with the latest technology can infuse new energy and creativity into the workplace. Additionally, middle-aged employees are eager to learn and take on new challenges, which drives innovative behavior adaptable to workplace-related stress. This finding aligns with the earlier findings of Oose et al., (2022) who noted that the age range of agro-researchers is between 35 and 60 years and this has influence on their level of job performance.

Table 1: Respondents' Characteristics (n= 261)

Items	Frequency/Percentages/Mean Value
1. Age in Years	Less than or equal to 40years 97(37.2%); 41-50years 90(34.5%); 42 years
2. Gender	Male 144(59.0%); Female 117(41.0%)
3. Marital Status	Married 155(59.4%); Single 97(37.2%)
4. Educational Status	First Degree 113(43.3%), Master Degree 32(12.1%)
5. Work Experience	Less than or equal to 10years; 188(72.0), Mean= 10.1years

Source: Data, 2024

Figure 2 shows the causes of work-related stress identified in the study area. Results revealed that increased workload (Weighted Mean Score (WMS) = 251.6), poor working conditions (WMS=234.8), and unclear work schedule (WMS=233.5) were identified as the major causes of work-related stress. This implies that increased workload experienced by the employees can significantly impact their stress level and hence affect job performance. Therefore, research institutes must carefully manage workloads and provide support measures for employees with heavy workloads to foster their productivity and job performance. This is supported by Thornicroft (2022) and Weigl et al., (2021) noted that excessive workloads represent a source of stress for workers and can negatively influence employees' health and job performance.

Table 2: Causes of Work-Related Stress (n= 261)

Variables	Always	Occasionally	Seldomly	Never	WMS	Rank
1. Increased Workload	44(16.9)	86(33.0)	93(35.2)	38(14.6)	251.6	1 st
2. Poor Working Conditions	41(15.7)	76(29.1)	77(29.5)	67(25.7)	234.8	2 nd
3. Unclear Work Schedule	26(10.0)	79(30.3)	72(27.6)	84(32.2)	233.5	3 rd
4. Role Ambiguity	30(11.5)	77(29.5)	102(39.1)	52(19.9)	232.6	4 th
5. Long Hour Work	32(12.3)	73(28.0)	102(39.1)	54(20.7)	232.1	5 th
6. Tight Deadlines	29(11.1)	71(27.2)	89(34.1)	72(27.6)	221.8	6 th
7. Work-Family Interference	36(13.8)	49(18.8)	70(26.8)	106(40.6)	205.8	7 th

Source: Data, 2024

The relationship between work-related stress and job performance mediated by innovative work behaviour (Table 3). In step 1 of the model, employees' biographies such as age, gender, marital status, educational status and years of experience were factored into the model to act as control variables and a significant association existed between marital status (b = .01, p < .05), work experience (b = .008, p < .05) and job performance. By this result it means that marital status and work experience of the employees has influence on their job performance. It then connotes that older respondents in the institute may exhibit better job performance than the newly recruited ones. Therefore, the findings created a link between workplace gender, years of experience, and job performance.

WR-S was entered into the model in step 2 and was negative and significantly related (b = -.09, p < .01) to job performance. Likewise, in step 3, innovative work behaviour was significantly related (b = .15, p < .02) to job performance. The third mediation condition was fulfilled when work-related stress controlled the significant relations between innovative work behavior and job performance. However, when innovative behavior was added to the model there existed evidence of partial mediation provided by the non-disappearance of a significant relationship between work-related stress (b = 5.38, p < .01), and job performance. Thus, the fourth mediation requirement was met, which aligns with Preacher and Leonardelli (2001). The study examines the mediating effect of innovative behaviour on the relationship between work-related stress and job performance. Findings are generally in tandem with earlier studies in the organizational dynamic theory. The finding implies that the inability of the employees to manage excessively increased workload, poor work conditions, and in-ability to clarify work schedules led to the stress experienced in the workplace. This agreed with the findings of Montaner et al., (2022), Ehring (2021), Luton et al., (2021) & West et al., (2021) that work-related stress develops when employees is unable to cope with work demands.

In addition, innovative work behavior mediates the relationship between work-related stress and job performance. The mediating role of innovative work behavior to work-related stress and job performance is supported in the literature by Asurakkody and Kim (2020) and Adam, (2022). This is expected because innovativeness at work helps in resolving workplace stress and enhances job performance. Employees who exhibit innovation at work are more creative in providing solutions to work-related stress and approach work in different ways. Employees with a high level of innovative behaviour embrace continuous learning and capacity development which can enhance employees' capability to cope with pressing job demands. Periodic on-the-job growth can lead to effective ways of managing work-related stress, ultimately boosting overall job performance. Therefore, encouraging innovative work behaviour among employees can effectively address work-related stress and enhance job performance among the workforce.

Table 3: Regression analysis (hierarchical) of In-B and PW-S to Job Performance

Regression steps	Model I			Model II			Model III		
	B	t-values	Sig	B	t-values	sig	b	t-values	sig
Step I									
1. Age in years	-.004	-.67	.50	-.003	-.52	.59	.003	-.50	.61
2. Gender	.06	.96	.33	.05	.85	.39	.05	.84	.39
3. Marital Status	.01	.26	.02**	.04	.80	.42	.04	.81	.41
4. Education Status	.04	1.44	.15	.02	.01	.50	.02	1.60	.31
5. Experience	.008	1.06	.005*	.005	.72	.31	.005	.71	.47
Step II: Predictors									
6. WR-S				-.09	5.99	.001*	-.01	5.38	.001*
Step III: Mediator									
7. In-B							.16	.15	.02*
R	.59			.41			.41		
R ²	.02			.17			.17		
ΔR ²	.01			.14			.14		
F	.04			6.91*			5.89*		
df	5/261			6/261			7/261		

5% = * n=261; Perceived Work-Related Stress (PW-S); Innovative Work Behaviour (In-B)
Source: Data, 2024

4. CONCLUSION AND RECOMMENDATIONS

The study concluded that increased workload and poor work conditions were the major identified causes of work-related stress in Nigerian research institutes. The study also concluded that work-related stress has a negative effect on employees' performance, hence it decreases overall job performance. Also, innovative work behaviour fostered a mediating effect between work-related stress and job performance, this aided the management of stress in the workplace and improved employees' job performance. The study recommends a continuous learning and skill development to enhance employees' capabilities to cope with job demands and adapt to changes in the institution. Also there should be a timely training workshop on innovative work culture and practices for enhanced job performance.

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NOVELTY STATEMENT

Employees who exhibit level of innovation at work are more creative in providing solutions to work-related stress for enhanced job performance

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IMPORTANCE OF DATA ANALYTICS IN BUSINESS

Natyra Dika-Krluku^{1*}

¹Public Enterprise for State Roads, North Macedonia, e-mail: natyra@t.mk



Abstract: In a world increasingly driven by data, data literacy is as essential as literacy itself, especially in the business sector. Consequently, every enterprise needs to build a foundation of data analytics literacy within their workforce. This means enterprises need more people who understand analytics and the benefits they can provide. By building analytics literacy, an enterprise can convert its data into actionable insights that drive decision-making and actions. This, in turn, can enhance business processes and foster greater innovation. To build analytics literacy, business professionals need to understand the various types of analytics they are likely to encounter.

Therefore, the purpose of this paper is to examine the awareness and readiness of business professionals regarding the importance of analytics in everyday business. Do they truly understand what analyses are? Can they distinguish between the different types of analytics and know when and how to use/perform/interpret them? Are they familiar with analytical tools and methods of conducting analyses? Furthermore, do they grasp the overall process of performing analyses—from collecting data to summarizing and presenting outcomes effectively—as a foundation for setting strategies and developing specific actions or tactics to achieve desired outcomes? The results from a survey conducted with several business professionals across different industries on the previously mentioned topics are used for the purposes of this paper.

Keywords: Analytics, data, business, insights, tools, visualization

Field: Economy

1. INTRODUCTION

Data literacy is the ability to read, write, and effectively communicate with data. Analytics literacy can be similarly defined as the ability to read, write, and communicate with analytics. The two are closely related because data is the raw material of analytics. Most companies are collecting data all the time—but, in its raw form, this data doesn't really mean anything. It's what you do with the data that counts

No matter what industry you're operating in, it's essential to understand what has happened in the past, what's going on now, and to anticipate what might happen in the future. The answer lies in data analytics. Data analytics is the process of **making sense of data**. The process starts with collecting data, finding patterns, and then using those patterns to make predictions. These predictions can be used to set goals or make decisions. In sales, for example, you may want to use data analytics to predict how many of a particular product you will sell next month. Knowing that number helps you set goals for your team and plan inventory.

The kinds of insights you get from your data depend on the type of analysis you perform. In data analytics and data science, there are 4 main types of data analysis: **descriptive**, **diagnostic**, **predictive**, and **prescriptive**. For conducting these types of analyses, appropriate tools and methods should be implemented. That is also depended by type of industry where the analyses should be performed

This research, based on the survey conducted with business professionals from various industries, revealed that most participants recognize the importance of data analytics in business operations. However, a significant number of respondents struggle to distinguish types of analyses. There are also gaps in knowledge about analytical tools and other issues.

This study aims to underscore the importance of these aspects in data analytics. It seeks to enhance the understanding of business professionals regarding data analytics and improve their performance by addressing these knowledge gaps.

2. MATERIALS AND METHODS

The survey consisted of a questionnaire with 15 questions covering various aspects of data analytics and was sent to business professionals and others from multiple industries. The questions aimed to assess the knowledge and awareness of businesses regarding analytics, starting with the importance of analytics, their engagement with analyses, and their understanding of different types of analyses. Additionally, the survey examined familiarity with analytical tools, data capture systems, methods of presenting results (including visualizations and storytelling), and awareness of analytics roles existence

*Corresponding author: natyra@t.mk



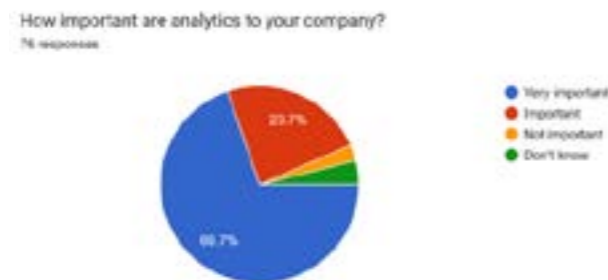
within companies. Most of the questions were multiple-choice or checkboxes, with some requiring short explanations to gather opinions on relevant topics.

The collected sample includes responses from 76 employees across both the private and public sectors, primarily professionals from Telecommunications, Construction, Education, and Public Administration. Various roles from different areas are covered, with the most dominant being in HR, IT, Finance, Consultancy. A summary of the results is provided in the next section.

3. RESULTS

Most of respondents stated that analytics are important in their jobs (Figure 1), and 76% that they conduct analyses in their work.

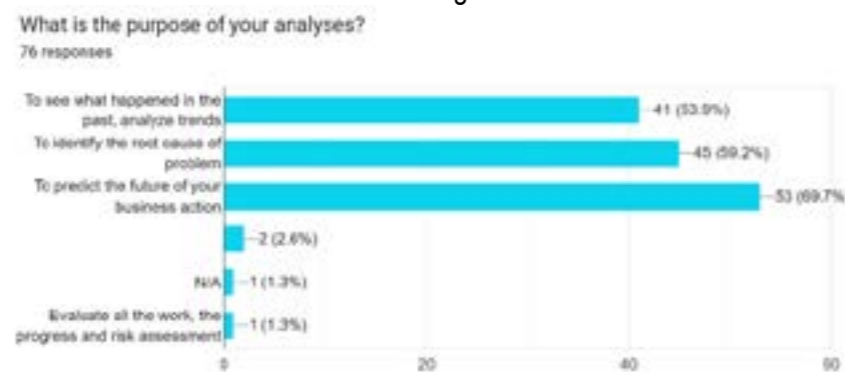
Figure 1



Source: The author

Regarding the question about the purpose of the analyses they conduct (Figure 2), the most frequently chosen response was: **“To predict the future of business actions.”**

Figure 2

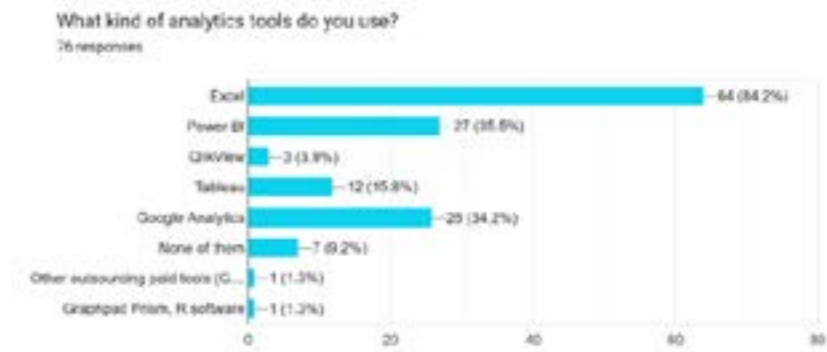


Source: The author

The responses where a short answer was required such as **“What kind of analyses you perform?”** and **“Can you distinguish between quantitative and qualitative analysis?”** where are particularly intriguing and warrant further analysis. The most of responses to the question “What kind of analyses do you perform?” are more like describing job functions. Some examples of provided answer are: “training needs analysis”, “KPI performance”, “financial analysis”, cost-benefit analysis, business cases, market analysis, work tasks, working conditions, etc. Only a few responses (5 from 62) mentioned types of analysis, such as descriptive, prescriptive, or diagnostic.

Regarding the question about the most used tool for conducting analyses, **“Excel”** was the most frequently chosen option (Figure3). Interestingly, despite its widespread use > 30% of respondents were unfamiliar with **Pivot Tables**—Excel feature for summarizing and analyzing data.

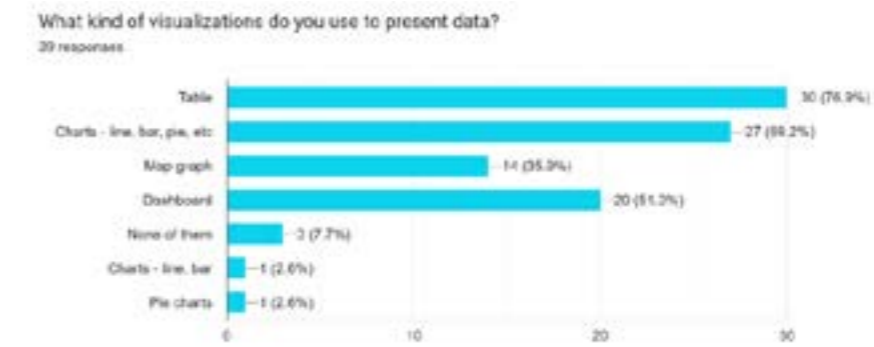
Figure 3



Source: The author

The most used visualizations, according to the survey, were **Tables** and **Charts**.

Figure 4



Source: The author

Regarding awareness of the business analyst role, **one-quarter** of respondents reported that they were not familiar with this role, and another **quarter** indicated that such a role does not exist in their company.

Half of the participants work in large companies, which was expected, since most respondents came from the Telecommunications and Construction industries.

4. DISCUSSIONS

Even though majority of participants have claimed that analytics are important for their companies and most of them are doing analyses for job purposes, the rest of responses suggest that understanding of how to perform and interpret analyses is limited among the respondents.

Obviously, there is a gap not only in understanding analyses and their purpose, but also in the usage of tools for doing analyses, systems that are used for data capture, visualization forms and their linkage with storytelling.

Although most of the participants declared that they use the analyzes for prediction of future, it was expected that this would be reflected in the rest of answers about analyses meaning, difference among them and used tools.

Regarding tools, logically it was expected that familiarity with Pivot tables, built-in features in Excel to be in the same, high level as usage of Excel as a most used tool by respondents of the survey. But that was not the case.

To ensure an effective and efficient analytical process, it's essential to understand the purpose of the analysis. Knowing what you aim to achieve and how it will influence decision-making is crucial. In today's business environment, professionals must be familiar with the 4 types of analytics, each serving a specific purpose and method.

Descriptive analytics the most basic type, which answers the question, “WHAT happened?” This type of analysis provides insight into past events, offering a comprehensive picture of how those events

unfolded. Descriptive analytics use visualizations to represent the data in an easily interpretable way, and producing hindsight. It is mostly used for: understanding past events; reporting metrics; identifying patterns and trends; providing information for business decisions; Benchmarking; Auditing and regulatory compliance.

Common tools for descriptive analytics include **Excel, Tableau, Power BI, QlikView, SAS, Google Analytics, etc.** It is widely used in: Retail Industry, Healthcare, Finance, etc

Diagnostic analytics, which answers the question 'WHY happened.' This type of analysis helps companies understand not only what happened but also why it happened and how they can prevent it from recurring. Also known as root cause analysis, it delves deeper to identify the root cause of events, providing insights into the underlying reasons.

Tools commonly used for diagnostic analytics include **Tableau, Power BI, QlikView, SAS, KNIME.** It is particularly useful in industries such as retail, marketing, finance, operations, healthcare, cybersecurity.

To extract actionable insights from large amounts of data, techniques such as machine learning and artificial intelligence come into play. These advanced techniques enable the next 2 types of analytics to be performed.

Predictive analytics answers the question "WHAT will happen next?" It uses existing data to determine future outcomes or trends. Companies often use this method when developing new products or services, as it provides insights into future customer preferences based on past behavior, producing foresight.

Common tools for predictive analytics include **R, Python, Tableau, Hadoop, RapidMiner, and KNIME.** It is widely applied across various sectors, including retail, finance, transportation and logistics, energy, telecommunications, cybersecurity, and manufacturing.

Prescriptive analytics is an advanced form of analytics that answers the question, "WHAT SHOULD be done?" or "WHAT CAN WE DO to make it happen?" It goes beyond predictive analytics by using past trends and data to recommend future actions.

Tools commonly used for this type of analysis include **SAS Optimization, IBM Decision Optimization, RapidMiner, Alteryx.** Prescriptive analytics has a wide range of applications across various industries, helping businesses optimize their decisions and operations in supply chain management, retail, finance, transportation and logistics, energy and utilities, telecommunications, and manufacturing.

Knowing the purpose of analysis also determines which type of analysis should be used, how to perform it, and where to apply it. According to Forbes, the top-rated analytical tools in 2024 are:

- **Microsoft Power BI** - for data visualization
- **Tableau** - for business intelligence (BI)
- **Qlik Sense** - for machine learning (ML)
- **Looker** - for data exploration
- **Klipfolio** - for instant metrics
- **Zoho Analytics** - for robust insights
- **Domo** - for streamlining workflows
- **Google Analytics** - for web traffic insight
- **SAP Analytics Cloud** - for enterprise performance management.

Here are some common use cases where analytics prove to be highly useful across various functions:

- ✓ **Marketing & Sales:** Analytics enables more accurate decision-making for marketing managers and enhances sales effectiveness. It helps in optimizing campaigns and refining sales strategies.
- ✓ **Operations and Supply Chain Management:** Analytics is applied in supplier selection, performance evaluation, predictive maintenance, location optimization, and inventory management.
- ✓ **Human Resources:** Analytics is used to improve talent management, with 84% of HR executives investing in it. Many companies plan to increase their analytics budgets over the next two years.
- ✓ **Customer Service:** By using data analytics and AI, businesses gain deeper insights into customer behavior, preferences, and satisfaction, beyond just tracking metrics.
- ✓ **Finance:** Analytics supports financial performance analysis, pricing strategy optimization, fraud reduction by identifying unusual patterns, cash flow forecasting, budget management, and revenue predictions.

Finally, communicating results to decision-makers is essential. After drawing conclusions from the analysis, the next step is to interpret and present the findings effectively. This involves using storytelling to convey insights to executives or leaders, helping them make informed decisions.

Data storytelling combines narratives and visualizations to present insights from data clearly. Visualization uses graphs, tables, maps, and other formats to make results easily understandable and

create a coherent story, usually delivered through presentations or reports. The right visualization can align understanding across diverse levels of expertise.

The storytelling should communicate a message grounded in the analysis's facts. When preparing a narrative, 2 key aspects must be considered: the **purpose of the analysis** and the **audience**. Understanding what the analysis aims and knowing the audience's expectations are essential. The story must align with the goal and be tailored to the audience to maintain their interest and focus.

5. CONCLUSIONS

It's clear that conducting analysis requires significant effort and preparation. Being an analyst is a responsibility that demands both extensive knowledge and experience. Effective analysts understand how things work and can bring clarity out of chaos. Therefore, it's essential to grasp the entire analytics process, understand what is needed for meaningful analysis, and determine the appropriate types and methods to apply.

Integrating data analytics into business operations has become essential for remaining competitive and achieving sustained success. Utilizing data analytics enables businesses to improve decision-making, streamline operations, enhance customer experiences, manage risks, and boost revenue growth. Therefore, investing in data analytics capabilities is crucial for any organization seeking to excel in today's data-driven market.

Given this, a strategic investment in analytics tools and employee training will empower businesses to harness the full potential of their data, driving informed decisions and fostering innovation.

Investing in appropriate analytical applications will empower employees to solve problems and uncover insights more swiftly. Implementing advanced analytics, including intuitive AI tools like predictive analytics, can help employees drive better decisions now and for the future.

This also necessitates investing in workforce development through internal training, third-party programs, and more.

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PRESERVATION AND PROMOTION OF MATERIAL CULTURAL HERITAGE: A COMPARATIVE ANALYSIS OF THE REPUBLIC OF SERBIA AND THE REPUBLIC OF NORTH MACEDONIA

Aleksandra Penjišević^{1*}, Branislav Sančanin², Anita Dimitrijevska Jankulovska³, Milica Denkovska⁴

¹Union Nikola Tesla University, Belgrade, Serbia, e-mail: aleksandra.penjisevic@gmail.com

²Medical College of Professional Studies, Belgrade, Serbia, e-mail: sancanin.branislav@gmail.com

³MIT University, Skopje, Republic of North Macedonia, e-mail: adimitrijevska@gmail.com

⁴Goce Delchev University, Shtip, Republic of North Macedonia, e-mail: milica.denkovska@gmail.com



Abstract: This study aims to assess the state of material cultural heritage in the Republic of Serbia and the Republic of North Macedonia, focusing on identification and promotion at both national and international levels, with an emphasis on digitization and improving the register of cultural assets. The recommended approach, which supports sustainable development, not only enables the comprehensive protection of all cultural resources, adding new value, but also minimizes the risk of permanent loss. The authors stress the importance of ongoing efforts to identify previously undiscovered cultural heritage and protect it from damage, decay, neglect, and theft. Given that cultural heritage is continuously exposed to natural elements and human activities, policymakers are encouraged to further raise awareness of cultural values and recognize threats arising from the short-term interests of local communities, which might result in erosion and loss of protected cultural monuments and landscapes.

The research utilized an opportunistic, convenience sampling method, surveying residents of the Republic of Serbia and the Republic of North Macedonia across five or eight regions (n1=163, n2=96, n=259). The findings revealed that 77% of respondents believe the protection of material cultural heritage is inadequate. Citizens of the Republic of Serbia identified unsatisfactory maintenance and a lack of financial resources as the greatest threats, while respondents from the Republic of North Macedonia pointed to unsatisfactory maintenance and weak enforcement of management regulations as their primary concerns. The research also indicated that individuals with advanced degrees (Magister, Master, and Doctor of Science) have a better understanding of material cultural heritage. Overall, the primary cause cited for a good knowledge of material cultural heritage was an interest in customs and traditions, while the key reason for insufficient knowledge was the lack of media representation.

Keywords: cultural heritage, Serbia, North Macedonia, UNESCO, preservation, promotion

Field: Social Sciences, and Humanities

1. INTRODUCTION

Cultural heritage encompasses a collection of resources, both material and immaterial, inherited from the past. These resources are recognized as reflections and expressions of continuously evolving values, beliefs, knowledge, and traditions shaped by the interrelation across time, between humans and their surroundings. Material cultural heritage includes immovable cultural assets, movable cultural assets, assets with provisional protection, and those under preliminary protection (Law on Cultural Heritage, 2021).

In the 21st century, systematic efforts to protect, promote, scientifically study, and valorize cultural heritage are not just the responsibility of individual institutions but of the entire society. This collective responsibility ensures the long-term preservation of distinctive cultural, historical, and architectural values. By continuously conserving, restoring, revitalizing, presenting, and educating about national cultural heritage, conditions are established for greater public and institutional involvement of Serbian cultural heritage in European cultural exchange. (Sančanin & Penjišević, 2023)

UNESCO's World Cultural Heritage and Sustainable Development Program highlights the potential benefits of proper heritage management from the perspective of sustainable development. Well-preserved heritage can enhance the environment's richness for both the current and upcoming generations, and the conservation of natural resources is crucial for sustainable management of the environment. Additionally, heritage plays a significant role in economic development by attracting investment. It also contributes to the spiritual well-being of people, given its strong symbolic, aesthetic, and spiritual aspects. Moreover, well-maintained heritage is essential for mitigating risks related to natural and human-caused disasters (Xiao et al., 2018). In this context, Sančanin (2019) highlights that integrating cultural and historical

*Corresponding author: aleksandra.penjisevic@gmail.com



heritage represents a significant qualitative advancement. This integration enriches the tourist experience by captivating feelings, improving engagements, and broadening the comprehension of spaces, folks, events, and artifacts from both past and present.

The UNESCO World Heritage List includes 1,223 properties: 952 cultural, 231 natural, and 40 mixed properties (UNESCO, 2024). From the Republic of Serbia, the following cultural sites are listed: Stari Ras and Sopoćani (1979), Studenica Monastery (1986), Medieval Monuments in Kosovo (2004, 2006), Gamzigrad – Romuliana, Palace of Galerius (2007), and Stećci Medieval Tombstone Graveyards (2016) (UNESCO, 2016). The Republic of North Macedonia has the following sites on the list: Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe – Natural (2007, 2011, 2017, 2021) and the Natural and Cultural Heritage of the Ohrid region – mixed (1979, 1980, 2019). (UNESCO, 2019)

Immovable cultural assets include cultural monuments, archaeological sites, notable landmarks, and spatial cultural-historical entities. The central register of the Republic of Serbia lists 2,645 immovable cultural assets: 2,272 cultural monuments, 96 spatial cultural-historical entities, 198 archaeological sites, and 79 notable landmarks (Institute for the Protection of Cultural Monuments of Serbia). In North Macedonia, as of February 2023, the Administration for the Protection of Cultural Heritage has registered 1,329 objects as cultural heritage. (Управа за заштита на културното наследство, 2023) The municipalities of Makedonska Kamenica, Aerodrom, Aračinovo, Ilinden, Sopište, Šuto Orizari, Krivogaštani, Bogdanci, Bosilovo, Češinovo/Obleševo, and Bogovinje do not have any protected cultural monuments (Spasevski, 2019).

The International Council on Monuments and Sites (ICOMOS, 2005) has identified major threats to cultural heritage, including deterioration, development, resource extraction, large-scale development projects, tourism, inadequacies in local governance, cultural changes or deficiencies, and socio-economic and national economic factors. A country's ability to create a positive impression is crucial not only for getting a site inscribed on the World Cultural Heritage List but also for converting its cultural wealth into economic and other advantages. (Schmutz & Elliott, 2016)

The UNESCO List of Intangible Cultural Heritage of Humanity includes 730 elements from 145 countries (UNESCO, 2023). The representative list from the Republic of Serbia features: Slava, the celebration of a family's patron saint's day (2014), Kolo, a traditional folk dance (2017), Singing to the accompaniment of the Gusle (2018), Zlakusa pottery making, traditional hand-wheel pottery making in the village of Zlakusa (2020), and Social practices and knowledge related to the preparation and use of the traditional plum spirit, šljivovica (2022) (UNESCO, 2022).

The Republic of North Macedonia has five features on UNESCO's representative list of intangible cultural heritage: the Feast of the Holy Forty Martyrs in Štip (2013), Kopachkata, a social dance from the village of Dramche, Pijanec (2014), Glasoechko, male two-part singing in Dolni Polog (2015), Cultural practices associated with the 1st of March (Bulgaria, North Macedonia, Republic of Moldova, Romania) (2017), and the Spring celebration, Hidrellez (North Macedonia, Turkey) (2017). (UNESCO, 2017)

2. MATERIALS AND METHODS

The primary survey was designed to assess how well the citizens of the Republic of Serbia and the Republic of North Macedonia are informed about material cultural heritage, including both immovable and movable heritage. It also aimed to determine whether cultural heritage is being managed properly and effectively, as well as to gather respondents' views on whether cultural heritage is at risk of destruction, disappearance, violation of integrity, or damage.

Q1. How familiar is the public in both countries with the material cultural heritage listed by UNESCO, and to what extent?

Q2. How effectively is cultural heritage being managed in these states?

Q3. What are the risks facing material cultural heritage, and to what extent is it endangered?

3. RESULTS AND DISCUSSION

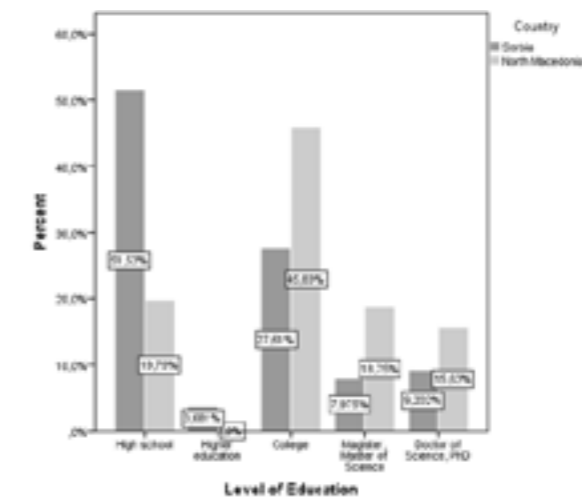
Information was gathered by utilizing a questionnaire carried out via Google Forms. The research employed an opportunistic, convenience sampling method, surveying residents from the Republic of Serbia and the Republic of North Macedonia across five or eight regions. A pilot survey with 55 respondents was initially conducted to test the content validity of the research measures. Following this, the final survey was developed and administered to a new group of 259 respondents (n=259). Data collection occurred from January to June 2024.

The survey was divided into two parts: the first part collected general demographic information, while the second part asked respondents to rate, on a scale, their knowledge of material cultural heritage, the management of cultural heritage, and the perceived threats and concerns regarding material cultural heritage.

Descriptive statistics, measures of dispersion, and measures of symmetry were computed to address the research inquiries. Non-parametric techniques, including the Chi-square Test, Mann-Whitney U test, and Kruskal-Wallis test, were used for hypothesis testing. The data were analyzed using the SPSS software package.

The study involved 259 respondents, with 62.9% from the Republic of Serbia and 37.1% from the Republic of North Macedonia. Of the respondents, 46.7% were male and 53.3% were female. The average age of participants was 36.24 years, with an average of 33.66 years for those from Serbia and 40.66 years for those from North Macedonia. The majority of respondents had a high school education (39.8%), followed by those with a college degree (34.4%). Additionally, 12.0% had a Magister/Master of Science degree, 11.6% had a Doctor of Science/PhD, and 2.3% had a vocational college education.

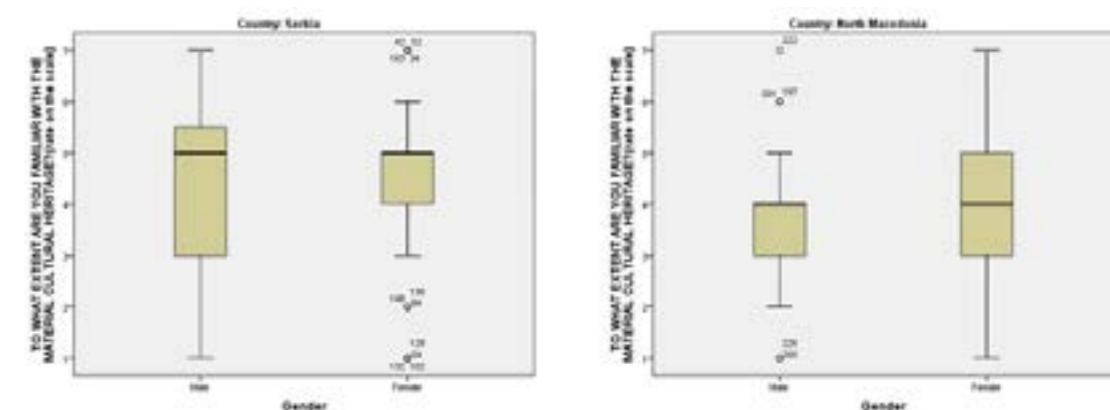
Graph 1. The structure of respondents in relation to the current level of education



Source: Authors' calculation

Respondents assessed their knowledge of material cultural heritage with an average score of 4.22, a median of 4, and a mode of 5. The mean skewness is -0.313, indicating a negative asymmetry. Respondents from the Republic of Serbia gave an average score of 4.44, with both the median and mode at 5. In contrast, respondents from the Republic of North Macedonia rated their knowledge with an average score of 3.84, and both the median and mode at 4. Overall, both male and female respondents provided similar average ratings, a trend observed among respondents from Serbia. However, female respondents from North Macedonia gave a higher average rating compared to their male counterparts. For further details, see Graph 2.

Graph 2. Knowledge of material cultural heritage in relation to the gender of the respondents

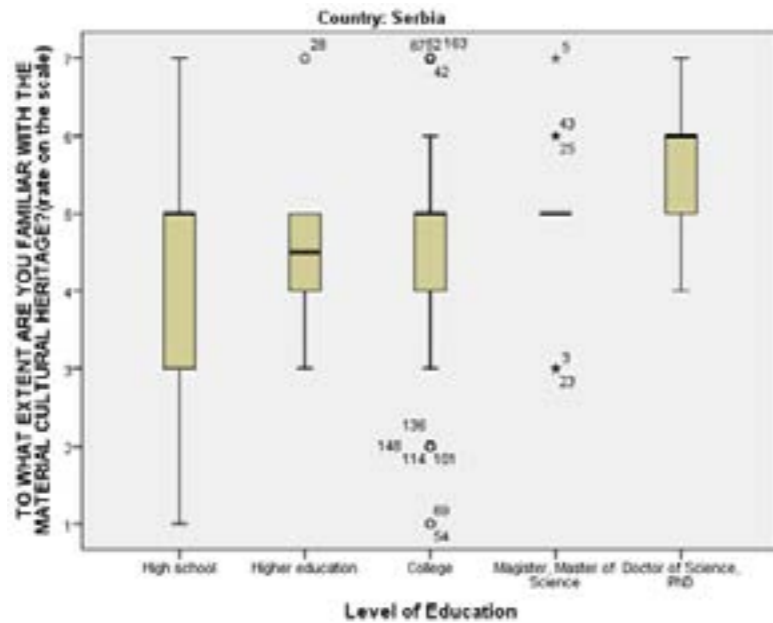


Source: Authors' calculation

When examining the average scores for knowledge of material cultural heritage based on education level, respondents with a doctoral degree rated their knowledge the highest, with an average score of 5.10. This is followed by Magister/Master of Science graduates with an average score of 4.71, those with higher education degrees at 4.67, and high school graduates at 3.95.

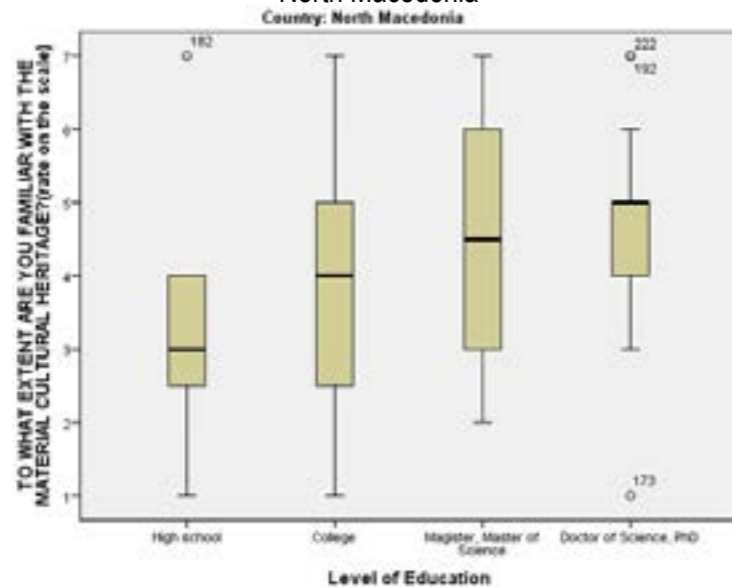
Looking at the results by country, respondents from the Republic of Serbia with a doctoral degree provided the highest average score of 5.33, while in the Republic of North Macedonia, Magister/Master of Science graduates provided the highest average score of 4.44. Graphs 2 and 3 illustrate that the 1.5 IQR interval for Doctor of Science respondents ranges from 4 to 7 for those from the Republic of Serbia and from 3 to 7 for respondents from the Republic of North Macedonia.

Graph 3. Knowledge of material cultural heritage in relation to the level of education - Republic of Serbia



Source: Authors' calculation

Graph 4. Knowledge of material cultural heritage in relation to the level of education - Republic of North Macedonia



Source: Authors' calculation

The Kruskal-Wallis Test identified a statistically substantial difference in the valuation of knowledge of material cultural heritage between five groups of participants categorized by education level (Gp1,

n=103: High school; Gp2, n=6: Higher education; Gp3, n=89: College; Gp4, n=31: Magister/Master of Science; Gp5, n=30: Doctor of Science), $\chi^2(4, n=259)=17.127, p=0.002$. Respondents with a doctoral degree had the highest Mean Rank, a trend that is consistent when viewed by country.

The chi-square test of independence revealed a important association between the reasons for insufficient knowledge of material cultural heritage (given by respondents who scored 4 or less) and their country of origin, $\chi^2(3, n=131)=12.118, p=0.007$. Cramer's V value of 0.304 indicates a large effect size (Gravetter & Wallnau, 2004, 2012). Respondents from the Republic of Serbia identified a lack of interest and deficient media exposure as the main causes for their restricted knowledge of material cultural heritage, each cited by 38.4% of respondents. In contrast, 46.2% of respondents from the Republic of North Macedonia cited insufficient media representation as their primary reason.

In the SPSS report, the Adjusted Residual value for the "I wasn't interested" reason among respondents from the Republic of Serbia is 2.8, indicating a significantly higher number of cases than expected. For respondents from the Republic of North Macedonia, the Adjusted Residual value is -2.8, showing a significantly lower number of cases than anticipated. For additional details, see Table 1.

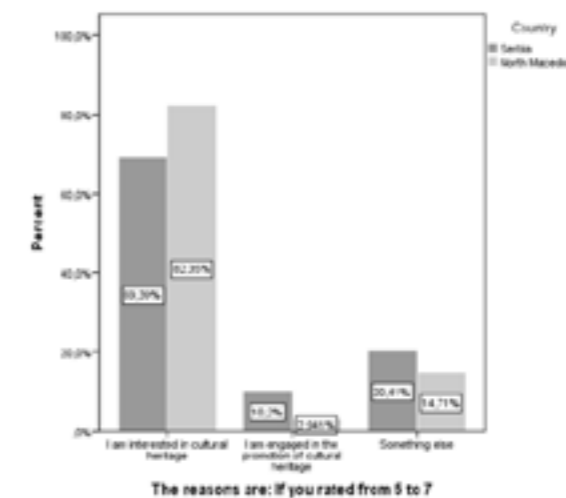
Table 1. Country * The reasons are: If you rated from 1 to 4 Crosstabulation

Country	Serbia	Count	The reasons are: If you rated from 1 to 4				Total
			I wasn't interested	We didn't learn about cultural heritage in school	Not enough e-content	Insufficient media representation	
Serbia	Count	23	16	4	23	66	
	% within Country	34,8%	24,2%	6,1%	34,8%	100,0%	
	Adjusted Residual	2,8	,6	-2,4	-1,3		
North Macedonia	Count	9	13	13	30	65	
	% within Country	13,8%	20,0%	20,0%	46,2%	100,0%	
	Adjusted Residual	-2,8	-,6	2,4	1,3		
Total	Count	32	29	17	53	131	
	% within Country	24,4%	22,1%	13,0%	40,5%	100,0%	

Source: Authors' calculation

Respondents who rated their knowledge of material cultural heritage with a score of 5 or higher cited a strong interest in cultural heritage as the main reason, with 72.7% indicating this as the main factor. For a country-specific breakdown, refer to Graph 4.

Graph 5. Reasons for good knowledge of cultural heritage in relation to the respondent's country



Source: Authors' calculation

The chi-square test of independence revealed a substantial connection between the factors leading to a high understanding of material cultural heritage (among respondents who rated 5 or above) and their educational background, $\chi^2(8, n=132)=16.443, p=0.036$. However, when analyzed by country, this significant relationship is found only among respondents from the Republic of Serbia ($\chi^2(8, n=98)=17.243, p=0.028$).

For material cultural heritage listed by UNESCO, respondents from the Republic of Serbia most commonly rated it with a 5, with an average response of 16. In contrast, respondents from the Republic of Macedonia most commonly rated it with a 1, with an average response of 71.

Regarding the adequacy of cultural heritage management, the largest percentage of respondents (47.5%) answered "Not enough," while 29.3% said "No," suggesting that 77% of respondents believe the state inadequately manages material cultural heritage. When considering the responses by country, the chi-square test of independence indicated a vital link between attitudes toward cultural heritage management and the respondents' country, $\chi^2(3, n=259)=18.054, p<0.001$.

In the SPSS report, the Adjusted Residual value for respondents from the Republic of Serbia and the "Not enough" item is 4.0, indicating a significantly higher number of cases than expected. Conversely, for respondents from the Republic of Macedonia, the Adjusted Residual value for this item is -4.0, indicating a significantly lower number of cases than expected. The Adjusted Residual value for respondents from the Republic of Serbia and the "No" item is -3.3, indicating a significantly lower number of cases than expected, while for respondents from the Republic of Macedonia, the value is 3.3, indicating a significantly higher number of cases than expected. Refer to Table 2 for further information.

Table 2. Management of cultural heritage Crosstab

		IS CULTURAL HERITAGE ADEQUATELY MANAGED?				Total	
		Yes	No	Not enough	I do not know		
Country	Serbia	Count	4	36	93	30	163
		% within Country	2,5%	22,1%	57,1%	18,4%	100,0%
		Adjusted Residual	-1,2	-3,3	4,0	-,7	
North Macedonia	Count	5	40	30	21	96	
		% within Country	5,2%	41,7%	31,3%	21,9%	100,0%
		Adjusted Residual	1,2	3,3	-4,0	,7	
Total	Count	9	76	123	51	259	
	% within Country	3,5%	29,3%	47,5%	19,7%	100,0%	

Source: Authors' calculation

For the effective management of cultural heritage, a smaller percentage of respondents with advanced degrees (Magister, Master of Science, and PhD) answered "I do not know"—about 10%, compared to around 22% of respondents with other educational levels.

The greatest threats to preserving material cultural heritage are identified as unsatisfactory maintenance and lack of financial resources, particularly by respondents from the Republic of Serbia. In the Republic of North Macedonia, the primary concerns are unsatisfactory maintenance and weak enforcement of management regulations. All variables contributing to these dangers—insufficient legal protection, unsatisfactory maintenance, weak enforcement of management regulations, lack of financial resources, and uncontrolled tourist exploitation—exhibit low variability, with a coefficient of variation (CV) around 31% and strong negative skewness, except for the variable of uncontrolled tourist exploitation, which shows no skewness (Skewness=-0.092).

Table 3. Descriptive measures of hazard assessment

Country		Insufficient of legal protection	Unsatisfactory maintenance	Inapplicability (weak application) of regulations related to management	Lack of financial resources	Uncontrolled tourist exploitation
Serbia	N	163	163	163	163	163
	Valid					
	Missing	0	0	0	0	0
	Mean	4,75	5,14	4,62	5,04	4,21
	Median	5,00	5,00	5,00	5,00	4,00
	Mode	5	7	5	6	5
Std. Deviation	1,442	1,567	1,572	1,531	1,734	
North Macedonia	N	96	96	96	96	96
	Valid					
	Missing	0	0	0	0	0
	Mean	5,27	5,63	5,53	5,31	4,75
	Median	5,50	6,00	6,00	6,00	5,00
	Mode	7	7	7	7	7
Std. Deviation	1,726	1,611	1,589	1,713	1,824	

Source: Authors' calculation

The Mann-Whitney U test exposed a statistically important difference in the assessment of the danger of cultural heritage from: Insufficient of legal protection for respondents from the Republic of Serbia (Me=5.0, n=163) and North Macedonia (Me=5.5, n=96), $U=6270.50, z=-2.726, p=0.006$. The size of the impact, i.e. it can be said that the impact is small (Cohen, 1988). The variable has a higher Mean Rank for respondents from the Republic of North Macedonia.

Unsatisfactory maintenance from the Republic of Serbia (Me=5.0, n=163) and North Macedonia (Me=6.0, n=96), $U=6266.50, z=-2.752, p=0.006$. The size of the impact, i.e. it can be said that the impact is small (Cohen, 1988). The variable has a higher Mean rank for respondents from the Republic of North Macedonia.

Inapplicability (weak application) of regulations related to management from the Republic of Serbia (Me=5.0, n=163) and North Macedonia (Me=6.0, n=96), $U=5169.00, z=-4.646, p<0.001$. The size of the impact, i.e. it can be said that the influence is medium (Cohen, 1988). The variable has a higher Mean Rank for respondents from the Republic of North Macedonia.

Uncontrolled tourist exploitation management from the Republic of Serbia (Me=4.0, n=163) and North Macedonia (Me=5.0, n=96), $U=6580.50, z=-2.168, p=0.030$. The size of the impact, i.e. it can be said that the impact is small (Cohen, 1988). The variable has a higher Mean Rank for respondents from the Republic of North Macedonia.

4. CONCLUSION

Cultural heritage is recognized as a unique and irreplaceable historical, social, and anthropological asset, making it a significant development potential. The importance of identifying, protecting, preserving, and promoting cultural heritage and products in the Republic of Serbia and the Republic of North Macedonia should be viewed through the lens of sustainable tourism's multiplicative effects, which create jobs and strengthen national identity.

Research results highlight the importance of cultural heritage to respondents from both countries, with those having higher education levels showing greater interest. However, approximately 77% of respondents believe that cultural heritage is poorly and inadequately managed, putting unique and indigenous resources from the past at increased risk. The lack of comprehensive data and information on material cultural heritage, its significance, protection measures, and promotion beyond national

borders, as well as the identification of undiscovered heritage assets, should be prioritized by institutions responsible for restoring, preserving, and promoting cultural heritage.

The authors recommend improving the registry of material cultural heritage, creating an accessible virtual reality platform, and intensifying protection and promotion efforts. The perceived threats to material cultural heritage, which serve as irreplaceable testimonies of national identity and significant economic potential, are complex and multilayered. Addressing these challenges requires an interdisciplinary and multidisciplinary strategic approach to ensure proactive and adequate responses.

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THE IMPACT OF ONLINE BUSINESS OF SMALL AND MEDIUM-SIZED ENTERPRISES: AN EMPIRICAL RESEARCH

Kristina Jauković Jocić^{1}, Tijana Đukić¹, Oliver Momčilović¹*

¹Faculty of Applied Management, Economics and Finance, Belgrade, Serbia
e-mail: kristina.jaukovic@mef.edu.rs, tijana.djukic@mef.edu.rs, oliver.momcilovic@mef.edu.rs



Abstract: This empirical research explores the links between customized marketing, improved customer support, business efficiency, competitive advantage, and adaptation to market trends towards the online business of small and medium-sized enterprises. The research goal was a deeper understanding of the relationships between the mentioned independent and dependent variables. The study aims to provide a comprehensive understanding of how these variables influence medium-sized enterprises online business success. The methodology includes analyzing data collected through surveys among 232 respondents from small and medium enterprises from the territory of the Republic of Serbia. Different analysis methods were used, statistical test analysis of variance, multiple correlation analysis of variables and to confirm the hypothesis multiple regression analysis, as well as qualitative analysis, to identify the key factors of online business of small and medium enterprises. Qualitative analysis complements these methods by identifying pivotal factors impacting small and medium-sized enterprises online business strategies. The results of the research indicate a significant positive and strong impact of customized marketing, improved customer support, business efficiency, competitive advantage, and adaptation to market trends towards the online business of small and medium-sized enterprises. Also, it was found that the online business of small and medium-sized enterprises can be explained directly through improved customer support at 54.76%, business efficiency at 46.24%, customized marketing at 44.89%, adaptation to market trends at 34.81%, and competitive advantage at 16.00%. By monitoring consumer and industry trends, small and medium-sized enterprises can adjust strategies and offerings to meet evolving customer needs, fostering revenue growth and expanding market presence. These studies contribute to the theoretical understanding of the online business of small and medium-sized enterprises.

Keywords: tailored marketing, improved customer support, efficient operations, competitive edge, adaptation to market trends, online business of small and medium-sized enterprises

Field: Social Sciences

1. INTRODUCTION

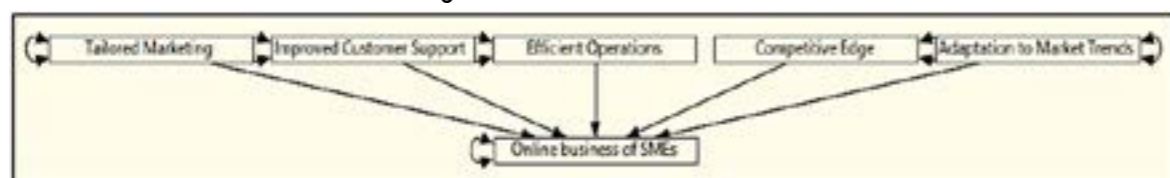
The proposed research model is defined by variables (Figure 1), based on which: subject, problem, tasks and hypotheses are set, where the independent variables are: Tailored marketing (abbr. TM), Improved customer support (abbr. ICS), Efficient operations (abbr. EO), Competitive edge (abbr. CE) and Adaptation to market trends (abbr. AMT), and the dependent variable Online business of small and medium-sized enterprises (abbr. OBSME). The research challenge resides in the insufficient comprehension of the interconnections among the many factors of TM, ICS, EO, CE, AMT and OBSME success. The subject of this research is the identification and analysis of the influence of the independent variables TM, ICS, EO, CE, and AMT on the dependent variable OBSME. This study aims to explore the interconnections among the aforementioned factors, aiming to offer strategic insights for SMEs seeking to optimize their approaches and gain competitive advantages in the online market. Specifically, it seeks to examine how Online Business Strategic Management Effectiveness (OBSME) relates to Technology Management (TM), Information and Communication Systems (ICS), Entrepreneurial Orientation (EO), Customer Engagement (CE), and Adoption of Advanced Marketing Technologies (AMT). The research endeavors to develop a comprehensive understanding of the pivotal variables influencing small and medium-sized enterprises success in digital commerce to gain competitive advantages. Customized marketing entails tailoring customer interactions by delivering targeted messages, products, and services that align with individual customer preferences and needs. According to (Kannaiah et al., 2024; Ejjami, 2024; Alshagawi & Mabkhot, 2024; Banerjee, 2023; Jain, 2024), customized marketing significantly impacts the online success of small and medium-sized enterprises by enhancing customer engagement, fostering improved customer loyalty, optimizing resource utilization, and deepening market understanding. According to (Costa, et al, 2024; Liu, & Ko, 2024; Kibor, 2024; Zoirov, 2023; Bradač Hojnik & Huđek, 2023) enhanced customer support plays a crucial role in the online success of small and medium-sized enterprises,

*Corresponding author: kristina.jaukovic@mef.edu.rs



leading to higher customer loyalty, strengthened brand reputation, decreased product returns, elevated customer satisfaction levels, and increased referrals and repeat purchases. The efficient utilization of resources and processes by small and medium-sized enterprises, also known as operational efficiency, can significantly impact their online business by reducing costs, speeding up order processing, improving inventory management, enhancing customer service, and increasing competitiveness. (Weng, et al., 2024; Liu, Chen & Ko, 2024; Ayaz & Tatoglu, 2024; Barata, et al., 2023; Chaudhary, Gkioulos & Katsikas, 2023). As per (Weng et al., 2024; Asikin et al., 2024; Przychocka & Sikorski, 2024; Kamar et al., 2023; Omidvar & Palazzo, 2023), competitive advantage is critical for small and medium-sized enterprises in the online domain. It significantly impacts their success through factors such as product/service differentiation, superior customer service, efficient cost management, innovation and technological progress, and agility in adapting to market changes. According to (Wu, Botella-Carrubi & Blanco-González-Tejero, 2024; Gil-Cordero et al, 2024; Hui, et al., 2024; Arce et al., 2024; Onngam & Charoensukmongkol, 2023), responding to market trends can greatly affect the online operations of small and medium-sized enterprises for multiple reasons, including maintaining competitiveness, discovering new business opportunities, refining marketing strategies, optimizing products and services, and strengthening the brand.

Figure 1. Theoretical research model



Source: Author's research

2. MATERIALS AND METHODS

An electronic questionnaire was utilized, which was completed online through the Internet. The questionnaire was conducted on the territory of the Republic of Serbia electronically on a sample of 232 respondents from the same number of small and medium-sized enterprises. The task of the research is: to determine whether or not there is a significant relationship between customized marketing, improved customer support, business efficiency, competitive advantage, adaptation to market trends and online business of small and medium-sized enterprises. The e-questionnaire consisted of two elements, the first in which questions were asked about the respondent's profile: gender, schooling and chronological age, and the second in which 3 statements were defined for all the set variables from the theoretical model, to which the respondents could answer their personal attitude using a Likert scale with 5 possible attitudes (1 - and totally disagree, 2 - partially disagree, 3 - neither agree nor disagree, 4 - partially agree and 5 - I totally agree). The assertions of the electronic questionnaire originate from the author's personal experiences and the sources mentioned in the research's introduction. The study utilized multiple regression analysis to evaluate the influence of the specified independent variables on the dependent variable and to predict changes in the dependent variable based on modifications in the independent variables. The mean values of the dependent variable were compared across various independent variables using an analysis of variance (ANOVA). Figure 1 depicts the theoretical system model of the research.

Null hypothesis H0: *There is no significant relationship between customized marketing, improved customer support, business efficiency, competitive advantage, adaptation to market trends and online business of small and medium-sized enterprises.*

Alternative hypothesis Ha: *There is a significant relationship between customized marketing, improved customer support, business efficiency, competitive advantage, adaptation to market trends and online business of small and medium-sized enterprises.*

3. RESULTS

Based on the Descriptive statistics research, several conclusions were drawn: the majority of respondents were women (125 or 53.88%), while men made up a smaller part (107 or 46.12%), this suggests a relatively balanced gender distribution in the sample. The majority of respondents have completed primary or secondary school (137 or 59.05%), while a smaller number of respondents have completed college or higher education (95 or 40.95%), this indicates diversity in the educational level

of respondents. Most respondents are between 18 and 35 years old (96 or 41.38%), a smaller part of respondents belong to the age group of 36 to 58 years (80 or 34.48%), while the smallest number of respondents are older than 58 years (56 or 24.13%), this suggests the diversity of age groups among the respondents. According to the guidelines for determining factor loadings based on sample size, we can conclude that a sample of 232 respondents is sufficient for significance. Based on the significance level of 0.40 for factor loadings with more than 200 respondents, we consider it to be significant. This conclusion is supported by the obtained Cronbach's coefficient for all statements in the research, which is $\alpha=0.8590$. The obtained Cronbach's coefficient $\alpha=0.8590$ is greater than the theoretical coefficient, indicating good consistency. This is in line with the rule of internal consistency, which states that a coefficient between 0.7 and 0.9 reflects good consistency. Both indicators demonstrate strong reliability and internal consistency of the scale for the sample of 232 respondents, encompassing all statements related to the research variables. Table 1 displays the average and standard deviation of all statements made in the Survey. High mean values imply a generally positive attitude among respondents, whereas standard deviations reflect the extent of heterogeneity in opinions among respondents.

Table 1. Means and standard deviations for the statements made

Claim	Mean	Std Dev
TM1 - We tailor our marketing strategy to the specific needs of our target online customers.	4.1853448276	0.9282254457
TM2 - We regularly use personalized email campaigns to capture the attention of online audiences.	4.4310344828	0.7915960856
TM3 - Our social media marketing efforts target our online audience directly.	3.9310344828	1.1336959282
ICS1 - Our online customer support is easily accessible and provides quick answers to customer questions.	4.3577586207	0.782121752
ICS2 - We regularly collect customer feedback to improve our online customer support.	4.3103448276	0.8365440462
ICS3 - Our online platform has functionality for direct communication with users via chat or e-mail.	4.275867069	0.8786669054
EO1 - We regularly implement process automation technologies to improve the efficiency of our online sales.	4.2543103448	0.8527919252
EO2 - We have a well-integrated inventory management system that helps us efficiently fulfill online orders.	4.4181034483	0.8334042364
EO3 - Our online platform is optimized for fast loading and easy navigation, which improves the user experience.	4.3318965517	0.9055957966
CE1 - Our online platform offers unique products or services that are difficult to find among competitors.	4.3103448276	0.8208726547
CE2 - We price our products or services competitively compared to other online sellers in our industry.	4.1939655172	0.926454751
CE3 - We regularly monitor and analyze the activities of competitors in order to keep pace and stand out in the market.	3.8620689655	1.1235114383
AMT1 - We regularly monitor trends in our industry and adjust our online strategy accordingly.	4.4827586207	0.9209703016
AMT2 - We have a flexible online platform that allows us to quickly adapt to changes in the market.	4.125	1.134609035
AMT3 - Our products/services reflect the current trends and needs of the target online audience.	4.5517241379	0.7541495894
OBSME1 - The impact of marketing activities, customer support and operational processes on the online success of your business is great.	4.1982758621	0.884883079
OBSME2 - Competitive advantage, adaptation to market trends and online business are connected in your company.	4.2974137931	0.8438174652
OBSME3 - The effective online business of your company compared to the competition is much higher.	4.3922413793	0.9427463668

Source: Author's research

Table 2 shows: Mean and Std Dev for all variables and they provide an insight into the general attitude of the respondents.

Table 2. Means and standard deviations for set variables

Variable	Tailored Marketing	Improved Customer Support	Efficient Operations	Competitive Edge	Adaptation to Market Trends	Online business of SMEs
Mean	4.1824713	4.3146552	4.3347701	4.1221264	4.3864943	4.295977
Std Dev	0.692667	0.6915527	0.6869202	0.5777075	0.6966902	0.6480393

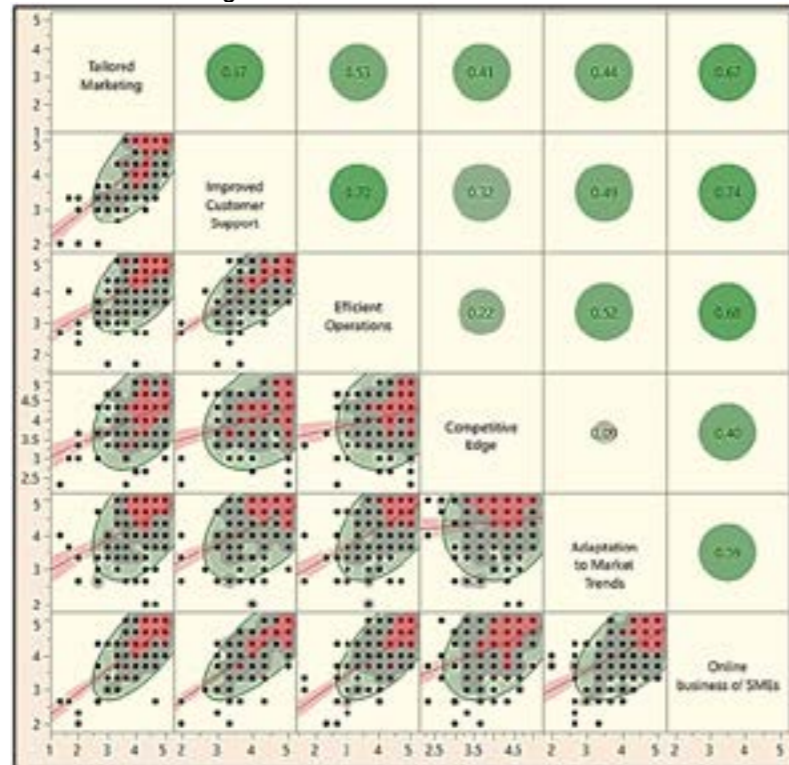
Source: Author's research

Figure 2 illustrates Pearson's correlation coefficients for each variable in the theoretical model that has been established. It is observed that all the relationships between the variables are directed positively, which implies the existence of a positive correlation or association between them. The highest

correlation coefficient was recorded between the independent variable ICS and the dependent variable OBSME, which is 0.74, which indicates a moderately strong positive correlation. The lowest correlation coefficient was recorded between the independent variables CE and AMT, with a value of 0.09, indicating a slight positive correlation. Direct correlations according to the dependent variable OBSME were given in the following order of independent variables: ICS 0.74, EO 0.68, TM 0.67, AMT 0.59 and CE 0.40. The dependent variable OBSME can be described

directly through the independent variables: ICS with 54.76%, EO with 46.24%, TM with 44.89%, AMT with 34.81% and CE with 16.00%.

Figure 2. Pearson's correlation coefficient



Source: Author's research

It can be concluded that the theoretical multiple regression model explains about 69.54% of the variation of the dependent variable OBSMEs using all the independent variables in the model. The multiple correlation coefficient is 0.833884 and it is strong and positive. The average error of the model is about 0.36, which suggests that the theoretical model provides accurate predictions. The results of the ANOVA analysis indicate that the theoretical model contributes significantly to the explanation of the variation in the data, given the high F-ratio and low p-value [$F(5,226)=103.1738$, $p<0.0001$]. The theoretical model is statistically significant. The alternative hypothesis H_a is accepted. Analysis of the regression coefficients from Table 3 Parameter Estimates found that the independent variables: TM, ICS, EO, CE and AMT have a statistically significant influence on the dependent variable OBSME. It indicates that the implementation of the independent variables: TM, ICS, EO, CE and AMT can significantly affect the outcome of the dependent variable OBSME. All of the independent factors exhibit a p-value below 0.05, indicating a strong statistical significance in their impact on the dependent variable OBSME.

This suggests that the independent variables are: TM, ICS, EO, CE and AMT and can be used in predicting or explaining the variation in the dependent variable OBSME. The order of the largest group influence on the dependent variable OBSME is by the following independent variables: ICS, AMT, EO, TM and CE.

Table 3. Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob> t	Std Beta	VIF
Intercept	-0.220977	0.225066	-0.98	0.3272	0	.
TM	0.1900879	0.049115	3.87	0.0001	0.203178	2.0445866
ICS	0.2659976	0.055724	4.77	<0.0001	0.283858	2.6233807
EO	0.2106825	0.050587	4.16	<0.0001	0.223323	2.13308
CE	0.177139	0.045618	3.88	0.0001	0.157914	1.2269284
AMT	0.2121922	0.041707	5.09	<0.0001	0.228122	1.4914628

Source: Author's research

Based on the data from Table 3 Parameter Estimates, a multiple linear regression equation was formed, which is shown at Formula 1:

$$\text{OBSME} = -0.220977 + 0.1900879 \cdot \text{TM} + 0.2659976 \cdot \text{ICS} + 0.2106825 \cdot \text{EO} + 0.177139 \cdot \text{CE} + 0.2121922 \cdot \text{AMT} \quad (1)$$

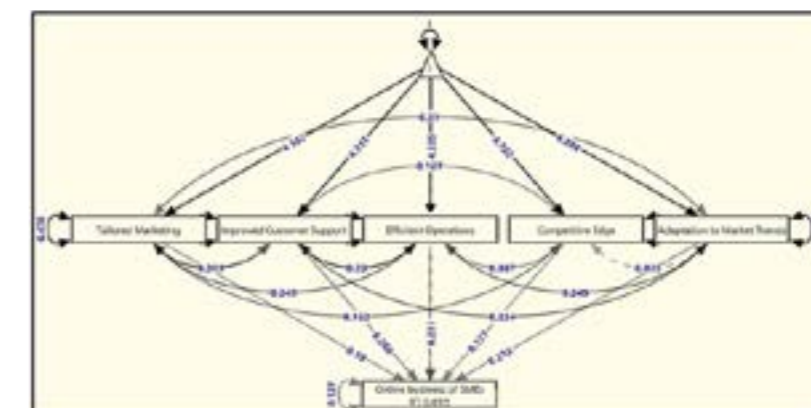
The research includes an attachment (Figure 3) that provides an extensive overview of non-standard contribution sizes to the theoretical research model. Additionally, Figure 4 presents a full analysis of standard contribution sizes to the theoretical research model.

4. CONCLUSION

According to the data gathered in this study, it is clear that there has been increase in various important areas - customized marketing (TM), improved customer support (ICS), operational efficiency (EO), competitive advantage (CE), and adaptation to market trends (AMT) - positively impacts the online business performance of small and medium-sized enterprises (OBSME). Customized Marketing (TM): By tailoring messages and offers, SMEs can effectively target their audience. As personalized marketing improves, small and medium-sized enterprises attract higher-quality visitors to their online platforms, leading to increased sales and business growth. Improved Customer Support (ICS): Enhancing customer support improves satisfaction, loyalty, and brand reputation. Positive customer experiences increase the likelihood of repeat business and referrals, contributing to revenue growth and business expansion. Operational Efficiency (EO): Streamlining operations reduces costs and enhances productivity. Improved processes enable SMEs to optimize resource utilization, thereby increasing profitability and supporting overall business growth. Competitive Advantage (CE): small and medium-sized enterprises with a clear competitive edge attract more customers and gain market share. Small and medium-sized enterprises improve their market position and achieve continuous business growth by offering innovative products/services, providing excellent customer service, and maintaining competitive pricing. Adaptation to Market Trends (AMT): Adapting to market trends ensures small and medium-sized enterprises remain relevant and competitive. By keeping track of consumer and industry trends, small and medium-sized enterprises can adjust their strategies and offerings to meet changing customer needs, thereby driving revenue growth and expanding their market presence.

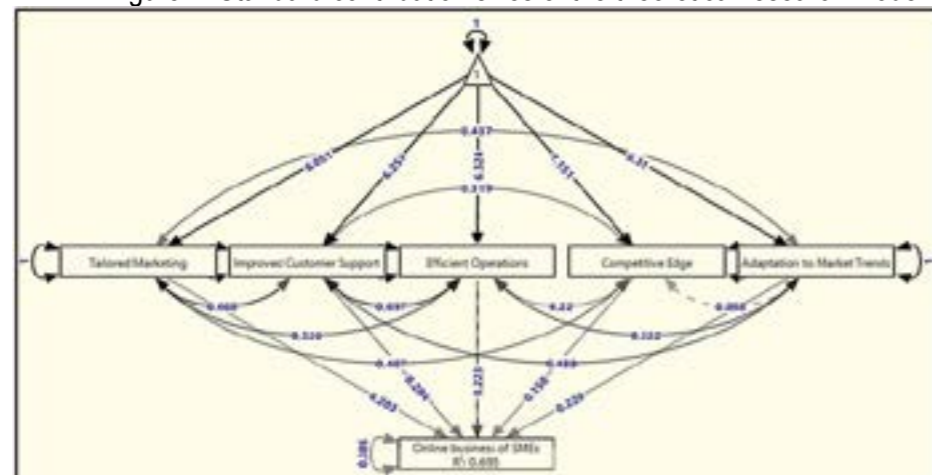
5. ADDITIONAL DATA

Figure 3. Non-standard contribution sizes of the theoretical research model



Source: Author's research

Figure 4. Standard contribution sizes of the theoretical research model



Source: Author's research

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VOLUNTARY PENSION FUNDS IN THE REPUBLIC OF SERBIA - COVID AND POST COVID PERIOD

Maja Dimić^{1*}

¹Faculty for business studies and law, University Union Nikola Tesla,
e-mail: maja.dimic@fsp.edu.rs



Abstract: The topic of this paper is the analysis of voluntary pension funds in the Republic of Serbia in the period 2019-2023: the role, performance, and structural characteristics. Voluntary pension funds have emerged as a significant component of retirement planning across the globe. Unlike mandatory pension schemes, which are compulsory and often state-managed, voluntary pension funds offer individuals the opportunity to augment their retirement savings beyond what is provided by state or employer-sponsored plans. Voluntary pension funds represent a contractual type of financial institution, with a significant share of their capital derived from client contributions, which define the contractual relationship between the fund and its clients. Unlike some other types of funds, such as investment funds, pension funds benefit from regular, monthly contributions or payments, which provide a steady influx of free capital for investment in the financial market.

Voluntary pension funds in Serbia represent a significant segment of the country's financial market, providing a supplementary avenue for retirement savings beyond mandatory pension schemes. The analysis reveals a general upward trend in net asset value, although a notable decline of 4,25% occurred in 2022 due to increased withdrawals and negative investment returns. Voluntary pension funds are predominantly invested in domestic government debt securities, with a significant portion also allocated to equities and term deposits. Market data indicates that Dunav Voluntary Pension Fund has consistently led the market in terms of net asset value, with other funds such as Generali Basic, DDOR Garant Ekvilibrio, and Raiffeisen Future following. Most assets are held in the domestic currency, while a smaller proportion is in foreign currencies, particularly euros. The findings highlight the importance of voluntary pension funds in providing financial security for retirees and underscore the need for ongoing evaluation and adjustment in response to market conditions and demographic trends.

Keywords: voluntary pension funds, net asset, the asset structure, currency structure of asset, Republic of Serbia

Field: Economics

1. INTRODUCTION

The primary objective of pension funds is to ensure clients receive a stable and secure income upon retirement, or a continuous cash flow after reaching a certain age. It is important to note that voluntary pension funds emerged as a response to ongoing global demographic changes. The extension of the average lifespan for both men and women, coupled with a decrease in the number of employed individuals and their replacement by modern technological solutions, has led economically developed countries to face challenges in providing quality pension payments to their citizens. Consequently, many countries encourage their citizens to opt for additional, voluntary pension insurance alongside mandatory schemes.

The founders of pension funds can be various legal entities, including banks, insurance companies, or other enterprises. The management company is tasked with managing the voluntary pension fund, making investment decisions, executing programmed payments, conducting administrative and marketing activities, and performing other business functions. The assets of a voluntary pension fund belong to the fund and its members and cannot be subject to forced collection, pledges, or mortgages. They also cannot be included in the liquidation or bankruptcy estate of the management company, custodian bank, or other entities, nor used to settle the obligations of fund members or others to third parties, thereby ensuring additional security for clients' assets.

Both individuals and legal entities have the right to make contributions to private pension funds, either independently or on behalf of employees in companies. Due to the specific nature of their function, pension funds are conservative institutions with a high aversion to risk, and legal acts and regulations restrict them to investments in specific securities. Additionally, the National Bank of Serbia, as the responsible supervisory body, monitors the investments and operations of voluntary pension funds operating in the domestic financial market.

According to the current Law on Voluntary Pension Funds and Pension Plans (2011), voluntary pension funds are subject to the following investment limitations: "Up to 10% of the assets of a voluntary

*Corresponding author: maja.dimic@fsp.edu.rs



pension fund can be invested in securities of a single issuer or in securities of two or more related issuers, except for securities issued by the Republic or the National Bank of Serbia; up to 5% of the assets of a voluntary pension fund can be invested in securities issued by the organizer of the pension plan that has joined the fund." The Law also precisely defines the net value of a voluntary pension fund. The value of the fund's assets comprises the total value of the securities in the fund's portfolio, real estate owned by the fund, and cash deposits held by the fund in banks. The value of the fund's assets is calculated based on market value.

2. MATERIALS AND METHODS

The paper provides an overview of the development of voluntary pension funds in the Republic of Serbia from 2019 to 2023 covering key trends, challenges, and opportunities faced by voluntary pension funds during this period. Data from various sources are utilized to examine the growth of the industry as well as the performance of voluntary pension funds and its impact on the broader financial market and domestic economy.

The paper employs both theoretical and empirical research methodologies to explore its subject matter. Theoretically, the authors explain fundamental concepts and present a comparative analysis of the functions of institutional investors within the capital market, with a specific emphasis on the role and impact of voluntary pension funds in the Serbian capital market. The empirical component of the research is underpinned by current literature, ongoing studies, and relevant case examples, particularly focusing on the impact of the Covid-19 pandemic and the subsequent period.

The research on voluntary pension funds in the Republic of Serbia necessitated the use of diverse methodological approaches, predominantly relying on desk research and the compilation of both primary and secondary data. The study will employ scientific methods, including analytical-synthetic, inductive-deductive, and comparative-classification techniques. Additionally, tabular, and graphical representations will be utilized to effectively present the summarized data under analysis.

The primary data source for this study is the National Bank of Serbia, which maintains comprehensive records of registered voluntary pension funds and their activities. Supplementary analysis is informed by secondary data from academic articles, reports, and other pertinent publications.

3. LITERATURE REVIEW

Recent literature emphasizes the evolving characteristics of voluntary pension funds, with a particular focus on trust, integration of environmental, social, and governance (ESG) criteria, and strategic adaptations to changing economic conditions. Key to the future success of these funds are advancements in financial literacy, innovative governance practices, and sustainable investing approaches. Future research should further investigate these aspects, concentrating on the practical application of these strategies and their long-term effects on retirement security. This literature review delves into the academic discussions on voluntary pension funds, analyzing their structure, advantages, challenges, and the determinants affecting their adoption and efficacy.

There is also a very limited literature body on the factors influencing voluntary pensions in the CEE region (Marcinkiewicz, 2017). Pienkowska-Kamieniecka (2013) states that the factors that affect the insufficient participation in the supplementary pension systems in the CEE region are at the low level of financial knowledge and inefficient fiscal incentives. Similarly, Choi et al. (2005) identify inertia and lack of financial literacy as major barriers to participation. Individuals often procrastinate or are unaware of the benefits and mechanics of these funds, leading to suboptimal retirement savings. Lusardi and Mitchell (2023) emphasize the role of financial literacy in enhancing trust and participation in voluntary pension schemes. They argue that individuals with higher financial literacy are more likely to understand the benefits of voluntary pension funds and thus participate more actively. Their research, conducted in the post-COVID era, suggests that targeted financial education programs can significantly improve participation rates in voluntary pension funds.

One of the primary advantages of voluntary pension funds is their potential to enhance retirement income. Antolin et al. (2008) argue that these funds can significantly bolster the financial security of retirees, especially in systems where mandatory pensions are insufficient. Additionally, voluntary pension funds offer tax incentives in many jurisdictions, such as tax-deferred growth and tax deductions on contributions, which can further enhance their attractiveness (OECD, 2018). Voluntary pension funds also promote a culture of savings and financial planning. Beshears et al. (2011) suggest that the presence of these funds encourages individuals to think more strategically about their long-term financial health,

leading to more disciplined saving behaviors. Moreover, the flexibility in contributions allows individuals to adjust their savings according to life changes, such as income fluctuations or unexpected expenses (Choi et al., 2004).

The economic environment plays a crucial role in shaping the strategies of voluntary pension funds. The OECD (2022) report outlines the challenges posed by a low-interest-rate environment and the need for pension funds to diversify their portfolios to ensure adequate retirement income. The report suggests that funds are increasingly turning to alternative investments, such as real estate and infrastructure, to achieve higher returns. Beshears et al. (2022) discuss the impact of behavioral economics on retirement savings, noting that automatic enrollment and default options have significantly improved participation in voluntary pension schemes. Their research underscores the importance of designing pension plans that leverage behavioral insights to enhance saving behavior and retirement outcomes.

Investment risk is another critical concern. The performance of voluntary pension funds is subject to market fluctuations, which can jeopardize the retirement savings of participants, particularly those nearing retirement (Antolin, 2008). The reliance on individual decision-making also means that inadequate investment choices can result in poor fund performance. Administrative costs and fees can erode the returns on voluntary pension funds. Bikker and de Dreu (2009) highlight that high management fees can significantly reduce the net benefits of these funds. Transparency in fee structures and efforts to minimize costs are essential to ensure that participants derive maximum benefit from their contributions.

Trust remains a pivotal factor in the participation and success of voluntary pension funds. Buchholz and Ohndorf (2023) discuss how pension fund management's transparency and accountability directly affect trust levels among participants, which in turn influences their willingness to contribute to voluntary schemes. Their findings highlight that higher trust levels correlate with increased participation and savings, particularly during periods of economic uncertainty.

The integration of ESG criteria into pension fund investment strategies has gained prominence. According to Thaler and Sunstein (2023), ESG considerations are becoming critical for pension fund managers seeking to mitigate long-term risks and enhance sustainability. They categorize ESG investing into three primary approaches: transformative (aiming to change the world), exclusionary (avoiding harm), and risk-focused (managing portfolio risk). Their review indicates that pension funds integrating ESG criteria tend to perform better over the long term due to improved risk management and alignment with broader societal values. Merton and Bodie (2023) further explore the financial implications of ESG integration, noting that pension funds incorporating ESG factors often experience lower volatility and higher returns. Their analysis of global pension funds highlights a growing trend towards sustainable investing, driven by both regulatory pressures and investor demand. Voluntary pension funds continue to evolve as an essential component of retirement planning, influenced by regulatory changes, economic conditions, and shifts in investment strategies. This review synthesizes recent research from 2022 to 2024, focusing on trust and participation, the integration of Environmental, Social, and Governance (ESG) criteria, and adaptive strategies in a fluctuating economic environment.

Clark and Monk (2024) provide a comprehensive overview of emerging governance models for pension funds, emphasizing the importance of transparency, accountability, and stakeholder engagement. Their study suggests that innovative governance practices, such as the inclusion of ESG criteria and enhanced communication strategies, are crucial for the future success of voluntary pension funds. Mitchell and Rappaport (2022) highlight recent innovations in retirement financing, including longevity insurance and life cycle funds. These innovations are designed to address the challenges of increasing life expectancy and changing retirement needs. Their review indicates that such products can provide more flexible and secure retirement solutions, complementing traditional pension schemes.

4. RESULTS

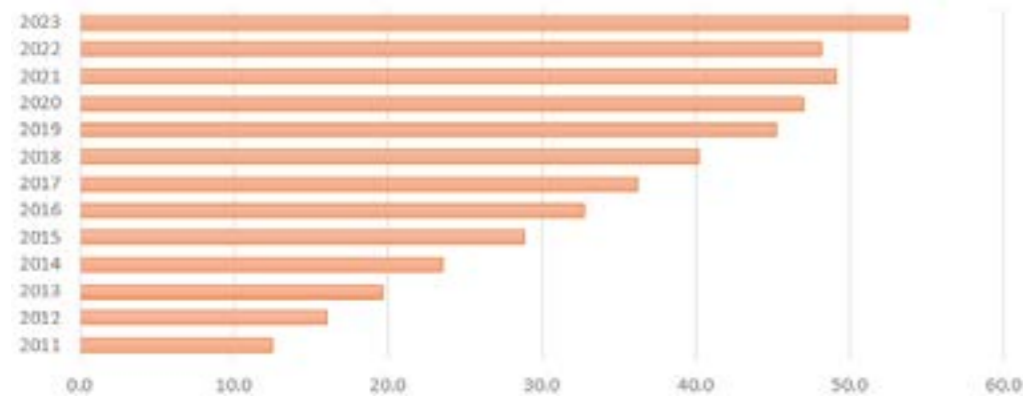
Data from the National Bank of Serbia's report on the Sector of Voluntary Pension Funds for the last quarter of 2022 indicates that the domestic market featured seven voluntary pension funds, four management companies, one custodian bank, five intermediary banks, and one insurance intermediary company. Compared to the most recent report for the fourth quarter of 2023, which shows the entry of an additional custodian bank into the market, the current market composition includes: four management companies managing the assets of seven voluntary pension funds, two custodian banks, five intermediary banks, and one insurance intermediary company (National Bank of Serbia, 2024).

From 2011 through the end of 2023, the net asset value of voluntary pension funds has generally exhibited an upward trend, except for 2022, which saw a 4.25% decrease in value. This decline can be attributed to fund withdrawals and the returns generated by the funds' investments (see Figure 1).

The National Bank of Serbia's report on the operations of voluntary pension funds at the end of 2022 reveals that total contributions amounted to 3.738,5 million RSD, representing an increase of 7,5 million RSD compared to 2021. However, members withdrew 3.530,1 million RSD, which was 1,3 billion RSD more than in 2021, while the loss from investments totaled 972 million RSD (National Bank of Serbia, 2023). In this context, the observed decline in 2022 is a result of the negative returns on invested assets—a phenomenon not previously recorded since the inception of the first voluntary pension fund in 2006. Additionally, there was a temporary increase in withdrawals due to adverse and risky conditions in the global financial market.

The net assets of the funds at the end of the fourth quarter of 2023 amounted to 53.8 billion dinars, representing an 11.5% increase compared to the end of 2022 and a 2.7% increase compared to the end of the previous quarter (National Bank of Serbia, 2024).

Figure 1. Net Assets of Voluntary Pension Funds, in Billion RSD



Source: National Bank of Serbia, *Voluntary Pension Funds Sector: IV Quarter Report for 2023*, p.4

The following table provides a detailed overview of the net asset value and market share of voluntary pension funds in the Republic of Serbia in the period 2019-2023. It illustrates trends in the financial performance and market presence of these funds within the domestic financial sector, highlighting their evolution and significance.

Table 1. Net Assets and Market Share of Voluntary Pension Funds

Voluntary pension fund/ Year	Net asset					Market share (in net asset)				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Generali Basic	13.075,8	13.477,0	13.726,4	13.166,7	14.582,5	28,90%	28,66%	27,98%	27,31%	27,12%
Raiffeisen Future	5.459,9	5.876,6	6.197,9	5.764,2	6.361,3	12,07%	12,50%	12,64%	11,96%	11,83%
DDOR Garant Ekvilibrjo	6.050,3	6.143,3	6.170,1	5.563,1	5.765,0	13,37%	13,07%	12,58%	11,54%	10,72%
Dunav	18.010,5	18.459,3	19.452,0	19.729,1	22.349,3	39,81%	39,26%	39,66%	40,93%	41,57%
Generali Index	1.095,6	1.220,6	1.334,8	1.619,6	1.891,4	2,42%	2,60%	2,72%	3,36%	3,52%
DDOR Garant Srbija	1.328,4	1.551,3	1.788,0	1.743,1	2.043,1	2,94%	3,30%	3,64%	3,62%	3,81%
Raiffeisen Euro Future	225,0	290,2	383,6	618,3	769,9	0,50%	0,62%	0,78%	1,28%	1,43%
SUM	45.245,5	47.018,2	49.052,8	48.204,1	53.762,5	100%	100%	100%	100%	100%

Source: Author's Analysis Based on Available Data from the National Bank of Serbia Website: https://nbs.rs/sr_RS/finansijske-institucije/penzijski-fondovi/izvestaji/, Statistical Annex

Data presented in Table 1 indicate that, during the observed period, Dunav Voluntary Pension Fund was the market leader based on net asset value, with an average market share of approximately 40%. It

was followed by Generali Basic, DDOR Garant Ekvilibrjo, and Raiffeisen Future, with average shares of 27%, 12,5%, and 12%, respectively. When categorizing voluntary pension funds based on their market share in net asset value, the following distribution is observed:

- Two large voluntary pension funds with a market share exceeding 20%.
- Two medium-sized voluntary pension funds with a market share between 5% and 19,99%.
- Three small voluntary pension funds with a market share of 5% or less.

The asset structure of voluntary pension funds reveals that approximately three-quarters of their investments are allocated to government debt securities, with additional investments in equities and term deposits (see Table 2). Data from the subsequent table show that from 2019 through 2023, voluntary pension funds exclusively invested in the domestic market. There is a notable trend of increasing investment, except for 2022, which saw a slight decline.

Table 2. Structure of Net Assets of Voluntary Pension Funds

Year/ Securities	Structure of net asset					Share of securities in net asset				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Investments in the Republic of Serbia	43.879,9	44.388,3	47.415,5	46.681,3	47.166,2	96,7%	94,2%	96,4%	95,7%	87,6%
Shares	5.042,4	5.668,9	6.676,7	5.242,6	5.821,1	11,1%	12,0%	13,0%	10,9%	10,8%
Government bonds	35.481,6	34.423,5	37.675,3	36.961,7	37.717,8	78,2%	73,1%	77,0%	76,6%	70,1%
Treasury bills	-	202,0	-	-	-	-	0,4%	-	-	-
Corporate bonds	1.491,2	1.489,8	-	-	-	3,3%	3,2%	-	-	-
Other securities	-	-	-	-	-	-	-	-	-	-
Investment funds	247,1	230,4	59,3	-	481,4	0,5%	0,5%	0,1%	-	0,9%
Real estate	-	-	-	-	-	-	-	-	-	-
Deposits	1.617,7	2.373,6	2.804,2	4.476,9	3.145,9	3,6%	5,0%	5,7%	9,3%	5,8%
Foreign investments	-	-	-	-	-	-	-	-	-	-
Securities	-	-	-	-	-	-	-	-	-	-
Investment funds	-	-	-	-	-	-	-	-	-	-
Custody accounts	1.485,0	2.770,8	1.790,5	1.583,2	6.464,5	3,2%	5,8%	3,5%	3,3%	12,0%
Receivables	44,3	13,6	14,0	1,3	290,4	0,1%	-	-	-	0,4%
Sum	45.156,8	47.172,7	49.169,0	48.265,8	53.811,1	100%	100%	100%	100%	100%

Source: Author's Analysis Based on Available Data from the National Bank of Serbia Website: https://nbs.rs/sr_RS/finansijske-institucije/penzijski-fondovi/izvestaji/, Statistical Annex

At the end of the of 2023, government bonds constituted 70,1% of the portfolio of voluntary pension funds, compared to 76,6% at the end of 2022, representing a decrease of 2,1 percentage points. Assets held in custodian accounts and term deposits with banks accounted for 13,8%, while investments in equities made up 10,8%. According to the latest report by the National Bank of Serbia, the average maturity of invested funds in government debt securities was 5,5 years: 9,4% of government debt instruments had maturities of up to one year, 5,7% had maturities between one and two years, 36,5% had maturities between two and five years, 43,8% had maturities between five and ten years, and 4,6% had maturities exceeding ten years (National Bank of Serbia, 2024).

Graph 2. Currency Structure of the Assets of Voluntary Pension Funds



Source: Author's Analysis Based on Available Data from the National Bank of Serbia Website: https://nbs.rs/sr_RS/finansijske-institucije/penzijski-fondovi/izvestaji/, Statistical Annex

Regarding the currency structure of assets held by voluntary pension funds in the Republic of Serbia, data from the following graph indicate that during the observed period, more than three-quarters of the funds' assets were denominated in the domestic currency. The remaining portion of the assets was held in foreign currency (euros).

5. CONCLUSION

Voluntary pension funds play a crucial role in retirement planning by providing flexibility and potential financial benefits to individuals. Understanding the trends and dynamics is crucial for policymakers, investors, and other stakeholders in making informed decisions and fostering a conducive environment for financial market growth (Dimic et al., 2024). However, their effectiveness depends on addressing challenges related to participation rates, investment risks, and administrative expenses. To maximize the advantages of voluntary pension funds, it is essential to enhance financial literacy, improve regulatory frameworks, and increase employer involvement. Future focus should be on exploring innovative strategies to boost participation and optimize fund performance, ensuring that these funds effectively complement mandatory retirement schemes and offer substantial financial security for retirees. Regulatory frameworks that offer tax incentives and establish clear guidelines for fund management can significantly increase the appeal of voluntary pension funds (OECD, 2018). Additionally, efforts to enhance financial literacy can enable individuals to make well-informed decisions about their retirement savings (Lusardi and Mitchell, 2014). Employer involvement is also essential in promoting the effectiveness of voluntary pension funds. Employers can enhance participation by implementing automatic enrollment, offering matching contributions, and educating employees about the advantages of these funds (Madrian and Shea, 2001).

During the pandemic, Serbian voluntary pension funds experienced a reduction in net asset value, primarily attributable to market volatility and increased withdrawal rates. Nonetheless, the sector has exhibited signs of recovery, with asset values gradually rebounding and a return to more stable growth patterns. Investment strategies have been recalibrated to mitigate risk, focusing on diversified portfolios that balance both domestic and international investments.

Furthermore, the structure of these funds has undergone significant changes. While a considerable portion of assets remains invested in domestic government securities, there has been a notable shift toward a more diversified asset allocation, including equities and international investments, to manage risk more effectively and enhance returns. Similarly, the currency composition of the assets has adapted, with a stable proportion held in foreign currencies to hedge against domestic economic fluctuations.

Overall, the post-COVID-19 period has emphasized the crucial role of voluntary pension funds in enhancing retirement security. The sector's ability to adapt and make strategic adjustments underscores its importance in supporting financial stability and ensuring sustained benefits for retirees in Serbia.

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FACTORS INFLUENCING JOB CHANGE WITH RELOCATION AND EMPLOYEE SATISFACTION IN IT COMPANIES

Saša Kukolj^{1*}, Nemanja Deretić², Slobodan Adžić¹

¹Faculty of Management, University Union Nikola Tesla, Republic of Serbia,
e-mail: sasa.kukolj@famns.edu.rs, s.adzic@famns.edu.rs

²Belgrade Business and Arts Academy of Applied Studies, Republic of Serbia,
e-mail: nemanja.deretic@bpa.edu.rs



Abstract: This paper investigates the key factors influencing job change with relocation and employee satisfaction, using statistical data analysis segmented by categories such as age group, gender, work experience, education level, and position within IT companies. The research is based on a sample of 161 employees in IT companies, selected through purposive sampling. The Mann-Whitney U test analysis revealed that men place more value on professional development and career advancement opportunities, while women give greater importance to work-life balance, preferring flexible working conditions. According to the Kruskal-Wallis test, differences are also evident among age groups: employees younger than 31 years prioritize professional development and exploring new opportunities, while those over 40 value quality of life and security. Employees in the middle age group (31-40 years) balance between these priorities. Regarding education, the results show that individuals with a high school education focus on stability and financial incentives, while those with higher education aim for career advancement and greater flexibility. Employees with master's degrees seek specialized positions that offer challenges and opportunities for further development. The research also showed that employees with less work experience emphasize opportunities for professional growth, while more experienced employees value quality of life and long-term benefits. Finally, variations in perception were observed among different positions within the company; managers prioritize stability and quality of life, while specialists focus on professional development and financial incentives.

Keywords: quality of work life, job change, IT company, relocation, employee satisfaction.

Field: Social Sciences.

1. INTRODUCTION

Job change is a significant career step, and when relocation is also considered, the impact on life and daily activities becomes even more complex. In modern society, where information technology plays a key role, workforce dynamism and mobility are omnipresent. This paper explores what most influences job change, especially when it involves relocation, through the analysis of opinions from 161 employees in the information technology sector, who vary in gender, age, education level, and job positions. This study is a continuation of previous research that examined the quality of work life and employee motivation in IT companies (Kukolj, Deretić, & Sančanin, 2023). This paper investigates additional aspects related to employee satisfaction concerning job change with relocation, with the sample size increased from 150 employees (Kukolj, Deretić, & Sančanin, 2023) to a total of 161 employees. Numerous studies in the literature identify factors as challenges associated with job change with relocation (Hippler, 2009; Sanda & Adjei-Benin, 2011; Mayrhofer et al., 2020; Arifa, El Baroudi, & Khapova, 2021). This research contributes to the identification of key factors that significantly influence the decision to change jobs with relocation, providing a foundation for improving working conditions and creating an environment that supports long-term productivity and employee satisfaction.

This research paper highlights the complexity of factors influencing the decision to change jobs with relocation, particularly in the dynamic information technology sector. The study found that professional development, quality of life, and financial incentives are key elements that significantly shape these decisions. It is important to note that different factors have a variable impact on different demographic groups, such as younger and older employees, as well as men and women, indicating the need for a more detailed analysis to understand the specific needs and motivations of employees. These insights are crucial for organizations aiming to better understand their workforce, with the goal of more effective human resource management and creating an environment that supports long-term productivity in the IT sector. Refusal of job offers that include relocation may be due to various factors depending on individual preferences, circumstances, and employee priorities (Myers, Park & Cho, 2023). Common reasons for declining such offers include attachment to the current environment, family obligations and

*Corresponding author: sasa.kukolj@famns.edu.rs



responsibilities, stability and security of the current job, as well as the risk and uncertainty associated with change. Additionally, misalignment with personal goals, quality of life in the current location, and insufficient motivation or benefits in the new offer play a significant role. Accepting an offer to relocate to another country largely depends on a combination of factors, including the economic, social, political, and health conditions in the new country, as well as the employee's personal circumstances and aspirations (Barbieri et al., 2022). STEM (Science, Technology, Engineering, Math) occupations exhibit the highest rates of job change closely followed by technology (Deming & Noray, 2020).

Key factors that may influence the decision to accept such an offer include the economic situation and business opportunities, working conditions and benefits, quality of life, language and culture, family circumstances, political stability, health conditions, as well as relocation costs and available financial support (Hur & Koh, 2023; Wu et al., 2024). Understanding these factors allows organizations to tailor their strategies to increase employee satisfaction and optimize the relocation process, which is particularly important in the globalized IT sector, where workforce mobility can be critical for long-term success.

2. MATERIALS AND METHODS

Through the research questions posed below, the aim is to provide a comprehensive insight into the impact of job change with relocation on employee satisfaction. The focus of the paper is on various aspects of this change, including how professional development, quality of work life, and financial incentives influence employees' decisions, as well as their long-term happiness and productivity. These research questions are designed to provide a deeper understanding of the challenges and opportunities that arise during such changes and to identify factors that may contribute to the successful adaptation of employees in a new work and living environment.

The following research questions were posed:

Q1: Are there significant differences in the perception of employee satisfaction regarding job change with relocation among different groups of employees?

Q2: What are the key factors that most influence employee satisfaction in relation to job change with relocation?

Q3: How do professional development, quality of work life, and financial incentives contribute to overall employee satisfaction in companies within the information technology sector?

Data for this research were collected through direct surveys, in which participants voluntarily agreed to participate. The research sample included purposefully selected employees from companies within the information technology sector, using purposive sampling. A pilot study included 35 respondents, while the final sample comprised 161 participants (n = 161). The research was conducted from May to June 2024 in the Republic of Serbia. The questionnaire was structured in two parts. The first part included questions about gender, age, education level, length of work experience, and current position in the company. In the second part, participants rated the extent to which factors such as professional development, quality of work life, and financial incentives influenced their decision to change jobs with relocation, using a scale from 1 (very dissatisfied) to 7 (very satisfied). Data analysis employed measures of central tendency, dispersion, and skewness. Non-parametric tests (including the Chi-square test, Mann-Whitney U test, and Kruskal-Wallis test) were used to test the hypotheses. Data analysis was performed using the SPSS software package.

3. RESULTS

The findings of the research are derived from the "Survey on the Influence of Factors Affecting Job Change with Relocation among Employees in IT Companies". As previously mentioned, the study included 161 respondents currently employed in IT companies, of which 101 were male (62.7%) and 60 were female (37.3%). Table 1 shows that the largest percentage of participants fall into the age group of up to 30 years (48.4%), and the most represented level of education is a completed college degree, with 41%. Regarding work experience in the company under study, the largest percentage of employees reported having 1 to 3 years of work experience (37.3%). In terms of positions within the company, just under half of the employees (46.0%) work as project designers (detailed information is provided in Table 1). These participant data allow for a deeper analysis and comparison of different groups.

The results of the Chi-square test of independence did not show a significant correlation between the gender of respondents and their education level, $\chi^2(df = 2, n = 161) = 0.064, p = 0.969$, nor between gender and their work experience, $\chi^2(df = 3, n = 161) = 3.659, p = 0.301$, or between gender and their job positions, $\chi^2(df = 3, n = 161) = 3.156, p = 0.368$. The research results indicate that gender is not

a significant factor in relation to education level, length of work experience, or current job positions. These findings imply that, within the sample examined, there are no statistically significant differences between men and women regarding educational achievements, work experience, and the positions they hold within their organizations. Such results suggest that men and women in this sample are equally represented across various segments of professional development and do not face significant gender barriers in access to education, gaining experience, and career advancement.

In modern society, where information technologies play a central role, workforce dynamism and mobility are becoming increasingly important factors. The IT sector, characterized by its rapid development and constant need to adapt to new technologies and market demands, often requires employees to be flexible and ready for change, including relocation to other cities or countries. Such mobility can have far-reaching consequences not only on an individual's professional life but also on their family relationships, social networks, and overall quality of life. Understanding these aspects is crucial for developing strategies that will enable employees to successfully manage career and life transitions while allowing organizations to retain talented personnel in a dynamic and competitive IT environment. Table 2 illustrates the extent to which certain factors influence job change accompanied by a change of residence.

Table 1. Socio-demographic structure of sample of employees (sample size 161)

Socio-demographic variable	Response	Frequency	Percent (%)
Gender	Male	101	62.7
	Female	60	37.3
Age group	Younger than 31 years old	78	48.4
	Between 31 and 40 years old	57	35.4
	Older than 40 years old	26	16.1
Level of Education	High School degree	59	36.6
	College or university degree	66	41.0
	Master of Science degree	36	22.4
Experience of working in a company	< 1 year	43	26.7
	1 year – 3 years	60	37.3
	3 years – 5 years	36	22.4
	> 5 years	22	13.7
Position in the company	Manager	21	13.0
	Document specialist	48	29.8
	Project designer	74	46.0
	Direct manager	18	11.2

Source: Author's research.

Respondents highlighted that financial incentives are one of the main factors influencing a job change associated with relocation. Higher salaries and incentives significantly affected employees' decisions to change jobs (Mean = 5.25; Median = 5; Mode = 6; Standard Deviation = 0.736). Professional development was also significant, though slightly less important than financial aspects. The offer of better positions and career challenges in the new location attracted a larger number of employees (Mean = 5.04; Median = 5; Mode = 5; Standard Deviation = 0.938). The quality of work life in the new location was a significant factor for job change, but in this study, it ranked behind professional development and financial incentives. Better living conditions, availability of cultural, sports, natural, or other amenities influenced employees' decisions (Mean = 4.75; Median = 5; Mode = 5; Standard Deviation = 0.783).

Table 2. Descriptive statistics of the impact of factors on job change accompanied by relocation

Influential Factor	Mean	StDev	CV (%)	Me	Mo	Skewness
Financial incentives	5.25	0.736	14.02	5	6	0.035
Professional development	5.04	0.938	18.61	5	5	-0.225
Quality of work life	4.75	0.783	16.48	5	5	-0.085

Source: Author's research.

The Mann-Whitney U test revealed a statistically significant difference in the impact of the professional development factor on job change accompanied by relocation between men (Me = 5.0; n = 101) and women (Me = 5.0; n = 60), U = 2,205.0, Z = -3.047, p < 0.01, r = 0.24. Men in the IT sector often place a strong emphasis on professional development and career advancement opportunities. They are inclined to accept offers that promise better positions and greater challenges. On the other hand,

women often emphasize work-life balance, seeking jobs and offers that provide better living conditions, such as flexible working hours or remote work. There is a statistically significant difference between men and women in the perception of the impact of professional development on job change accompanied by relocation, with men perceiving this factor as more significant than women.

The Mann-Whitney U test also showed a statistically significant difference in the impact of the quality of work life factor on job change accompanied by relocation between men (Me = 5.0; n = 101) and women (Me = 5.0; n = 60), U = 2,507.5, Z = -1.979, p < 0.05, r = 0.16. Male employees often view relocation as an opportunity to expand business contacts and network within a broader professional environment. In contrast, women frequently consider social aspects, such as the potential for forming new friendships and engaging in shared activities in the new location. There is a statistically significant difference between men and women in the perception of the impact of quality of work life on job change accompanied by relocation, with women perceiving this factor as more significant than men (for more details, see Table 3).

The Mann-Whitney U test did not reveal a statistically significant difference in the impact of financial incentives on job change accompanied by relocation between men (Me = 5.0; n = 101) and women (Me = 5.0; n = 60), U = 2,810.5, Z = -0.847, p = 0.397. This test suggests that, according to the research data, gender does not have a statistically significant impact on how financial incentives influence the decision to change jobs along with relocation. In other words, men and women have similar attitudes or behaviors concerning this factor.

Table 3. Mann-Whitney U test results based on gender of respondents

Results	Professional development	Quality of work life	Influential factor
Mann-Whitney U	2,205.00	2,507.50	2,810.50
Wilcoxon W	4,035.00	7,658.50	4,640.50
Z	-3.047	-1.979	-0.847
p value	0.002**	0.048*	0.397

Note: *p-value is less than 0.05, ** p-value is less than 0.01.
Source: Author's research.

The application of the Kruskal-Wallis test revealed significant differences in the perception of influential factors on job change accompanied by relocation among three different age groups (Group 1: <31 years, n = 78; Group 2: 31-40 years, n = 57; Group 3: >40 years, n = 26). The analysis showed statistically significant differences across all three influential factors: professional development ($\chi^2(2, n = 161) = 45.624, p < 0.01$), quality of work life ($\chi^2(2, n = 161) = 31.493, p < 0.01$), and financial incentives ($\chi^2(2, n = 161) = 39.815, p < 0.01$). For more details, see Table 4. The age groups of employees differ in their perception of the importance of professional development, quality of work life, and financial incentives as factors influencing the decision to change jobs accompanied by relocation. This suggests that age might be a significant factor in career decision-making, and that different age groups of employees may have varying priorities when considering a job change.

Table 4. Kruskal-Wallis test results based on the age group of respondents

Results	Professional development	Quality of work life	Influential factor
Chi-Square	45.624	31.493	39.815
df	2	2	2
p value	0.000**	0.000**	0.000**

Note: ** p-value is less than 0.01.
Source: Author's research.

The Kruskal-Wallis test revealed significant statistical differences in the perception of factors influencing job change accompanied by relocation among three groups of respondents based on their education level (Group 1, n = 59: high school; Group 2, n = 66: college or university degree; Group 3, n = 36: master's degree). The results showed statistically significant differences across all three factors: professional development ($\chi^2(2, n = 161) = 45.624, p < 0.01$), quality of work life ($\chi^2(2, n = 161) = 31.493, p < 0.01$), and financial incentives ($\chi^2(2, n = 161) = 39.815, p < 0.01$). For additional details, see Table 5. Different education levels (high school, college or university degree, master's degree) are associated with varying priorities regarding professional development, quality of work life, and financial incentives. These differences suggest that individuals with different educational backgrounds have different motivations and expectations when considering changes in their careers and location.

Table 5. Kruskal-Wallis test results based on respondents' education level

Results	Professional development	Quality of work life	Influential factor
Chi-Square	7.017	6.258	11.807
df	2	2	2
p value	0.030*	0.044*	0.003**

Note: *p-value is less than 0.05, ** p-value is less than 0.01.
Source: Author's research.

The Kruskal-Wallis test revealed significant statistical differences in the perception of factors influencing job change accompanied by relocation among four groups of respondents based on work experience (Group 1, n = 43: < 1 year; Group 2, n = 60: 1 year – 3 years; Group 3, n = 36: 3 years – 5 years; Group 4, n = 22: > 5 years). The results showed statistically significant differences across all three factors: professional development ($\chi^2(3, n = 161) = 8.249, p < 0.05$), quality of work life ($\chi^2(3, n = 161) = 10.877, p < 0.05$), and financial incentives ($\chi^2(3, n = 161) = 12.792, p < 0.01$). For more details, see Table 6. Respondents with different lengths of work experience differ significantly in their perception of professional development, quality of work life, and financial incentives as important factors for job change and relocation.

Table 6. Kruskal-Wallis Test Results Based on Respondents' Work Experience in the Company

Results	Professional development	Quality of work life	Influential factor
Chi-Square	8.249	10.877	12.792
df	3	3	3
p value	0.041*	0.012*	0.005**

Note: *p-value is less than 0.05, ** p-value is less than 0.01.
Source: Author's research.

The Kruskal-Wallis test revealed significant statistical differences in the perception of factors influencing job change accompanied by relocation among four groups of respondents according to their position within the company (Group 1, n = 21: Manager; Group 2, n = 48: Document Specialist; Group 3, n = 74: Project Designer; Group 4, n = 18: Direct Manager). The results showed statistically significant differences across all three factors: professional development ($\chi^2(3, n = 161) = 7.991, p < 0.05$), quality of work life ($\chi^2(3, n = 161) = 8.533, p < 0.05$), and financial incentives ($\chi^2(3, n = 161) = 8.169, p < 0.05$). More detailed information can be found in Table 7. Respondents holding different roles (managers, document specialists, project designers, and direct managers) have significantly different perceptions regarding professional development, quality of work life, and financial incentives as key factors in deciding on job change and relocation.

Table 7. Kruskal-Wallis test results based on respondents' position in the company

Results	Professional development	Quality of work life	Influential factor
Chi-Square	7.991	8.533	8.169
df	3	3	3
p value	0.046*	0.036*	0.043*

Note: *p-value is less than 0.05.
Source: Author's research.

4. DISCUSSIONS

The research revealed significant differences in how men and women in the IT sector perceive factors influencing job changes involving relocation. Men place greater value on professional development and career advancement opportunities, making them more likely to accept offers with better positions and challenges. Women, on the other hand, prioritize work-life balance, preferring jobs with flexible conditions like remote work and flexible hours. The study also found that women place more importance on quality of life, considering factors like the work environment, inclusive company culture, and social interaction opportunities crucial in their decision-making. Men view relocation more as an opportunity to expand professional networks. However, the research found no significant gender differences in the perception

of financial incentives, with both men and women valuing financial benefits similarly when deciding on job changes and relocation. These findings suggest that men and women have different priorities and motivations when considering such transitions.

The analysis of age-related impacts on job change and relocation decisions in the IT sector revealed significant differences in priorities and motivations among three age groups: under 31, 31-40, and over 40. Kruskal-Wallis test results showed statistically significant variations in how these groups perceive professional development, quality of work life, and financial incentives. Employees under 31 prioritize rapid professional growth and career challenges, valuing flexibility and opportunities to explore new locations. They see networking as key to long-term advancement. Those aged 31-40 seek a balance between professional development and stability, carefully weighing financial implications and work-life balance. Employees over 40 focus on quality of life and job security, finding it harder to adapt to changes due to longer careers and life experience. For them, proximity to family and a support network often plays a crucial role in decision-making. These findings suggest that age significantly shapes employees' priorities and motivations when considering job changes and relocation. Different age groups value distinct aspects of these transitions, which should be factored into employment policies and strategies in the IT sector.

Significant differences in how education levels influence job change and relocation decisions stem from varying career motivations and priorities. High school graduates may focus more on stability and financial incentives, while those with higher education, such as a college degree, prioritize career advancement and flexibility. Employees with master's degrees often seek specialized, challenging roles with opportunities for professional growth. These differing priorities impact how each group perceives the importance of professional development, quality of work life, and financial incentives when considering job changes and relocation.

Significant differences in perceptions of job change factors based on work experience reflect respondents' career stages. Those with less experience (under 1 year) prioritize professional development and gaining experience, while those with more experience (3 to 5 years or more) value quality of work life, stability, work-life balance, and long-term financial benefits. As experience grows, motivations and priorities shift, leading to varied perceptions of the importance of professional development, quality of work life, and financial incentives in job change and relocation decisions.

Differences in how employees perceive factors influencing job changes and relocation across company positions stem from their varying responsibilities and priorities. Managers and direct managers, with greater responsibilities, may prioritize quality of life and stability to balance work and personal life. In contrast, document specialists and project designers focus more on professional development and financial incentives, as career growth is their main priority. These differing roles lead to variations in how employees value professional development, quality of work life, and financial incentives when considering job changes and relocation.

5. CONCLUSIONS

The research revealed significant differences in perceptions of factors influencing job changes involving relocation among IT sector employees, based on gender, age, education, work experience, and company position. Men prioritize professional development and career advancement, making them more likely to accept challenging job offers that require relocation, while women emphasize work-life balance and prefer flexible working conditions. Younger employees seek rapid career growth and new experiences, whereas older employees value stability and quality of life. Higher education levels lead employees to seek specialized roles with advancement opportunities, while those with lower education focus on stability and financial incentives. Work experience also shapes priorities, with less experienced employees seeking growth and seasoned employees preferring stability and long-term benefits. Company position reflects specific responsibilities, affecting how employees value professional development, quality of work life, and financial incentives. These findings underscore the need to consider diverse employee priorities and motivations when shaping employment policies and strategies in the IT sector.

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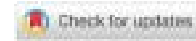
APPLICATION OF ARTIFICIAL INTELLIGENCE IN EDUCATION IN THE FUNCTION OF RAISING ENTREPRENEURIAL COMPETENCE

Jelena Stojanović^{1}, Nebojša Denić², Kostadinka Stojanović¹, Momir Milić³*

¹Faculty of Mathematics and Computer Sciences, Alfa BK University, Belgrade, Serbia,
e-mail: jelena.stojanovic@alfa.edu.rs, kostadinka.stojanovic@alfa.edu.rs

²University of Priština, Faculty of Sciences and Mathematics Kosovka Mitrovica,
e-mail: nebojsa.denic@pr.ac.rs

³Faculty of Information Technologies, Alfa BK University, Belgrade, Serbia,
e-mail: milicmomir153@gmail.com



Abstract: In the time we live in, the digital competencies of employees represent an important factor in achieving positive business results. In this sense, the integration and application of modern technologies and artificial intelligence in the learning and teaching process is of crucial importance in the information society of the 21st century. It is precisely the emergence of artificial intelligence and the rapid development of ICT that constantly affects the challenges of life and work, and therefore the success of students through the education system as members of a society in which ICT is an indispensable part. It is known that the development of information technologies has initiated improvement in various areas such as: finance, business, health, education, and the entire labour market. In this research work, it will be evolved to a new review of the relevant literature and research in practice, how artificial intelligence can influence the outcome of the educational process and increase the entrepreneurial competencies of employees. In this direction, this research will present a research study of questionnaires applied for analysis and obtaining data on training and testing for statistical evaluation. Statistical analysis will be based on the application of artificial intelligence, i.e., Adaptive Neuro-Fuzzy Inference Systems (ANFIS).

In this research, we use the ANFIS methodology to determine the most important factors of student success in teaching. Based on the review of the relevant literature, it is evident that there is not enough research that would deal with the analysis of the relationship between students' success in mathematics and the factors that influence it. This is confirmed by the research results, which indicate that the quality of students' work in practice is influenced by several different factors: educational technology, teacher competence, teacher motivation, etc. This type of research fills the gap in the lack of research to determine which key factors have the strongest impact on student success.

The research results of this paper confirm that the application of artificial intelligence in teaching through educational software, among other things, can be a key success factor for improving teaching. In this sense, the effects of the application of artificial intelligence and specific educational software and the effects they have on student motivation, that is, the interest and self-confidence of all factors of the educational process, have been identified. The obtained results indicate the benefits and advantages that educational institutions can have from the introduction of educational technologies in teaching. In this way, technology has become not only useful, but also a necessary instrument for purposeful action in society.

The results of the research show that artificial intelligence through Neuro-fuzzy architecture was created with the aim of overcoming complex and complex problems, it has its application in situations that are mostly impossible to describe analytically. Once learned ways to overcome complex problems, they can be applied after schooling in order to contribute to raising the entrepreneurial competencies of pupils and students, which will lead to the improvement and modernization of business and help you stay relevant in the labour market.

Keywords: Education, artificial intelligence, business intelligence.

Field: Education

1. INTRODUCTION

Quality education requires students to be digitally literate, for the ultimate goal of entrepreneurial competence (Denić et al. 2017). The data showing the growth and application of e-learning, as surprising as it is, reflect the real needs of modern man and the age in which he lives ("the age of knowledge"). E-learning, the most common form of distance learning, has proven to be the only way of learning that allows individuals and groups to successfully master different educational content, at any place and at any time, which will later be used for professional development (Milicevic et al., 2021).

Therefore, in this paper we will consider the main goal of educational software, the improvement of teaching performance, which makes teaching attractive both for the teaching process and for learning itself, all with the ultimate goal of raising entrepreneurial competencies (Miljković, J., Ljujić, B., 2012).

*Corresponding author: jelena.stojanovic@alfa.edu.rs



Educational software is a combination of information and communication technology (ICT) and electronic learning (e-learning) (Denic & Zlatkovic, 2017).

2. PARADIGMS OF APPLICATION OF ICT IN TEACHING

ICT as a teaching tool and ICT as a learning tool (Shelly, G., et al., 2012):

- removes time and space barriers, because students can get in touch with the teacher and communicate with each other and exchange information anytime and anywhere,
- provides access to global knowledge,
- facilitates the exchange of knowledge, as students can make presentations and notes individually or in groups and monitor their progress,
- enables immediate exchange of experiences and better practice, and such learning becomes more interactive and fun through various multimedia tools and encourages experiential learning, opens windows for new thinking, innovation, brings joy and motivation to the new with the ultimate goal of developing practical skills.

Table 1. Indicators of successful application of ICT in an educational institution

Indicators of successful application of ICT in an educational institution	Description of indicators
Technological means	Optimization of equipment types and characteristics in accordance with the needs and requirements of the educational institution.
Installed technologies	Planning, coordination and verification of requests, communication media, furniture, lighting, security and insurance, educational institutions.
Technologies available to students and teachers	Providing staff who can support adequate work and learning for ICT users.
Technology service	Maintenance and upgrade of hardware and software.
Professional development	Development of human capacities of employees in an educational institution – INSET for teachers, librarians, professional associates and other employees.
Planned technologies	Documentation of ICT implementation plans and its placement in the educational public.
Used technology	monitoring the time spent at the computer with the aim of performing various educational tasks of the participants in the educational process.
Achieved educational outcomes	Level of ICT competence of users of ICT resources.
Effectiveness in mastering certain teaching subjects	Achievement of educational goals, including independence in learning.
Funding	Total money spent on ICT implementation.

Source: (Shelly, G., et al., 2012):

3. ANFIS (ang. Adaptive Neuro-Fuzzy Inference Systems)

We use the ANFIS methodology to determine the most important factors for student success in mathematics (Stojanović et al., 2021). In this sense, some authors emphasize that the process of acquiring knowledge is far more effective when it is combined with educational technologies in mathematics classes in elementary school (Radovanović, B. 2020). We have a similar situation in secondary education, where the effect of acquiring knowledge is significantly more effective in situations when it is connected with the motivation to learn mathematics (Rajović, J. et al. (2020).

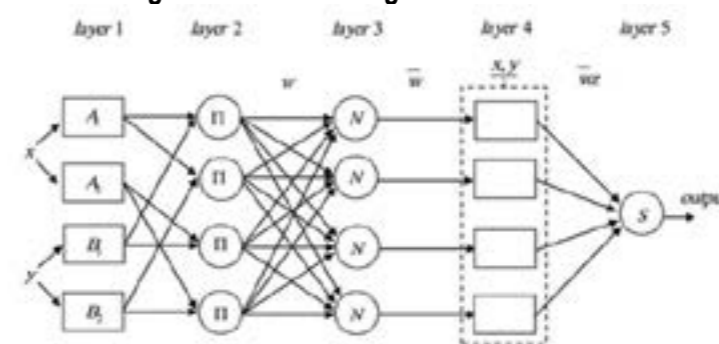
Based on the review of the literature, it is evident that in the world today there are close to 150 million of students and students who attend so-called online classes, of which approximately 25% are students. This fascinating data is changing every day, because the number of e-students and e-students is increasing drastically and students are digitally literate in order to be able to actively and effectively follow the lessons. In this sense, some authors emphasize the importance of the introduction of educational technologies into the teaching process, because it is obvious that the phenomenon of the Internet has radically changed the educational process, that the business market is more demanding and that we must be digitally literate in order to be more competitive on the market (Nikolić, V. and all 2019).

It is known that there are more than 140 million online students in the world, and the growth rate

of the number of students is estimated to be around 20%. This fascinating data is changing daily, as the number of e-learners is continuously increasing. That is why today it is necessary for pupils and students to be digitally literate. The priority of educational institutions must be the introduction of ICT into the educational system, because we are all aware that the Internet has changed the educational process, that the business market is more demanding and that we must be digitally literate in order to be more competitive on the market (Nikolic, V. et all 2019).

Neuro-fuzzy architecture was created with the aim of overcoming complex and complex problems and situations that are mostly impossible to describe analytically. It is precisely these systems that represent the synergy of neural networks and fuzzy inference systems. In the following Figure 1, a schematic representation of the ANFIS model is given.

Fig. 1. Schematic diagram of the ANFIS model



Source: (Hesami, 2019)

For the purposes of the work, the research was conducted in the experimental group, three classes of the first grade of secondary education, namely secondary schools and high schools, from territorially different environments participated. In addition to the above, other students belonged to another group. The students of the "Mihajlo Petrović Alas" Technical School from Kosovska Mitrovica, the Electrical Technical School of Priština-Gračanica and the students of the Gymnasium from Priština, temporarily relocated to Laplje Selo, took part in the research. Respondents from the Technical School "Mihajlo Petrović Alas" are in the concept of learning "from station to station", they covered the teaching unit in two school hours. 88 subjects of the experimental group and 86 subjects of the so-called control group participated in the research. The classes were conducted by three teachers.

The test of knowledge, carried out in the next school hour through a fifteen-minute test, in the control and experimental groups, was shown in table 2.

Table 2: Results of knowledge test of groups of groups

	1	2	3	4	5
Control	18%	40%	23%	10%	9%
Experimental	3%	20%	40%	22%	15%

Source: author's research.

4. CONCLUSIONS

The process of effective integration of software into the educational process is a complex and multifaceted process that includes not only educational technology, but also computer programs and pedagogy, institutional readiness, teacher competence, as well as planned long-term funding. The daily and effective use of ICT is still a problem for teachers, but it brings us long-term benefits for entrepreneurial competence. Experiences in practice show that educators encounter obstacles in the use of ICT, and therefore do not use it to the extent that results in positive learning effects. The literature emphasizes that one of the novelties of the 21st century is digital technology, which is closely related to a different, new approach to the curriculum, which necessarily implies reshaped learning goals and related activities in the educational process, the end result of which will be competent personnel on the labor market.

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LEADERSHIP IMPACT ON THE EFFECTIVENESS IN DIGITALISED IT ORGANISATIONS

Iliya Lindov^{1*}

¹Sofia University "St. Kliment Ohridski", Bulgaria, e-mail: iliya@lindov.com



Abstract: The study investigates the critical role of leadership in digitalized organizations, focusing on how different leadership styles influence organizational performance after the digital transformation process. Effective leadership in this context requires a blend of traditional leadership qualities and a deep understanding of digital technologies, enabling leaders to navigate their organizations through complex digital transitions while fostering innovation and adaptability. The study highlights that in a digitalized environment, leadership extends beyond traditional management practices. Digital leaders must cultivate a culture of continuous learning and collaboration, empowering employees to engage actively in the digital transformation process. The research also reveals that successful leaders in such environments must exhibit empathy, adaptability, and willingness to embrace uncertainty, as these qualities are essential for sustaining both personal and organizational growth. The research was conducted within a multinational software company, examining three teams with distinct leadership styles. Blake and Mouton's Management Grid was utilized to assess the leadership approaches, while Kaplan and Norton's Balanced Scorecard provided a comprehensive evaluation of teams performance across learning and innovation, internal processes, customer satisfaction, and financial outcomes. The study found that teams led by leaders with a strong balance between concern for people and results, specifically those aligned with the "Team Management" style, achieved superior performance across most of the metrics. These teams demonstrated higher levels of employee satisfaction, innovation, and customer satisfaction, coupled with better financial results, including increased profitability and lower operating costs. Furthermore, the findings suggest that in organizations characterized by high intellectual demands and digitalized operations, leadership styles that prioritize open communication, low power distance, and a balanced approach to people and task orientation are most effective. The study concludes that the success of digital transformation efforts is closely linked to the quality of leadership, with leaders who can adapt to the demands of the digital age, playing a crucial role in ensuring long-term organizational success.

Keywords: digitalization, digital leadership, organisational effectiveness

Field: Social sciences

1. INTRODUCTION

Digital transformation, and the digitalized business models, have a multifaceted nature that determines the complex impact they exert on the economy and society (Hensellek, 2020; Khan, 2016). One of the key factors in maintaining and improving the performance of organizations during the transition to digitalization, or of the already digitalized companies, is the leadership. In the digital age, it requires not only a good combination of traditional leadership qualities, but also a deeper understanding of the digital technologies. Leaders need to be able to steer their organisations through digital transformations while fostering innovation and adaptability.

The digitalized environment presents new challenges for leaders. According to De Araujo et al. (De Araujo, Priadana, Paramarta, & Sunarsi, 2021), a digitalized business strategy has a huge impact on every employee in the organization, but its effect is particularly strong for the digital leaders, which invariably leads to an evolution of their styles. These challenges include reducing budget while maintaining service standards, rethinking value creation to sustain growth, and globalizing support functions to increase cost efficiencies. In addition, leaders must engage in strategic, long-term planning to identify new growth opportunities in the face of the changing, and accelerated market dynamics. The advent of digitalization, in the form of disruption to traditional work practices and business, requires organizations to rethink their business and operating models, ensuring they invest in digital technologies and apply them intelligently and effectively to maintain focus on their core mission. Effective leadership in this era requires more than clarity of thought, it requires empathy, adaptability, and willingness to embrace uncertainty for both personal and organizational growth (Mihai & Cretu, 2019).

Khan (2016) explores the impact of digitalization on management and leadership, outlining six key characteristics of this new work atmosphere: greater interconnectedness; information abundance and accelerated decision-making, or also called "real-time management"; promotion of symbiotic relationships due to the humanising effect of the digitalization.

*Corresponding author: iliya@lindov.com



To demonstrate the interconnectedness between organizational effectiveness and successful digital leadership, the author examines the production performance of three teams, part of a multinational, geographically dispersed, digitalized software company. The study was carried out one and a half years after the successful completion of the digitalization project within the unit, which the teams are part of. Financial results presented are on an annual basis unless otherwise stated.

2. MATERIALS AND METHODS

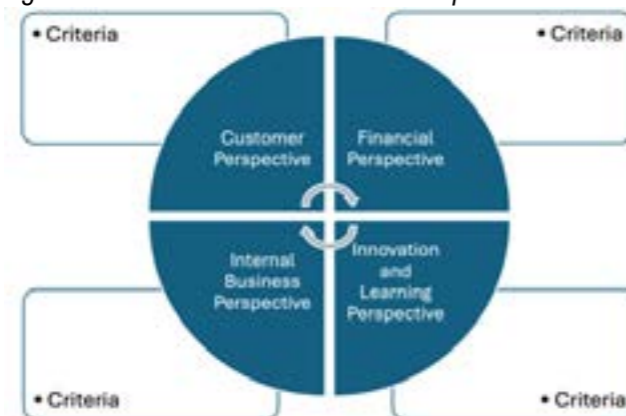
For convenience the examined teams are named A, B and C. The study was conducted in four phases. In order to assess the teams' effectiveness in a digital environment as a function of leadership, it is necessary in the **first stage** to determine the leadership styles of the respective leaders. For this purpose, the author uses Blake and Mouton's "Management Grid" (Blake & Mouton, 1985) (Blake & McCanse, 1991), which is a widely used method in the business for assessing leaders. It is based on the behavioural leadership theories and in particular the works of Lewin, Lippitt & White (1939) who, based on a number of studies, defined three main behavioural leadership styles: authoritarian, democratic and delegating ("laissez-faire"). Later, as part of studies at The Ohio State University and the University of Michigan, the hundreds of the analysed leadership behaviour types were reduced to two generalized categories: 1) organizational structuring; and 2) with attention to the people (Halpin & Winer, 1957). According to them, a leadership style can be oriented in two directions: task-oriented and relationship-oriented.

For the positioning of the three examined leaders on the Blake and Mouton's "Management Grid", through employee-completed questionnaires, each leader is given a score of one to nine on two criteria - concern for people and concern for results. Depending on the scores, they are positioned on a matrix as the extreme scores, and in particular the mid-point scores, define the leadership styles of respectively:

- **Impoverished management (1,1)** - characterized by minimal concern for results and people, i.e., mediocre leadership aimed at maintaining organizational membership but nothing more.
- **Authority-compliance management (9,1)** - extreme concern for performance. Work is organized in a way that minimizes group participation in decision making.
- **"Country club" management (1,9)** - prioritizes attention to people's satisfaction, creates a friendly environment and a moderate pace of work.
- **Team management (9,9)** - considered the most effective management style. The leader is strongly committed to excellent people satisfaction while maximizing results.
- **Middle-of-the-road management (5,5)** - the leader balances between the two criteria, maintaining performance at a moderately satisfactory level.

In the later phases of the research, in order to evaluate the effectiveness of each team, the author uses the method developed and presented in 1992 by Kaplan and Norton called the "Balanced Scorecard" (Kaplan & Norton, 1992). It is based on a project, aimed at developing a methodology, and metrics for assessing organizational effectiveness at the General Electric company. It was carried out by a group of employees who came to the conclusion that purely financial metrics were far from sufficient for the set objectives. As a result of their research, they arrived at a list of one financial and seven non-financial metrics, which Kaplan and Norton later reduced to four "perspectives" (Figure 1):

Figure 1. The "Balanced Scorecard" of performance indicators



Source: Kaplan & Norton (1992)

- **Innovation and Learning Perspective** – takes into account the company's ability and capacity

to innovate, improve its products and maintain the level of knowledge of its employees.

- **Internal Business Perspective** – complementing the customer perspective, this seeks to define and assess "what we should be best at". It requires managers to focus on evaluating processes, decisions, actions that are relevant to the customer satisfaction.

- **Customer perspective** – managers are required to reduce their customer treatment policy to measurable criteria.

- **Financial Perspective** – consideration of the financial indicators and the direction, which they are targeting, as a result of changes in previous measurement perspectives and as a result of the implementation of set strategies.

The generalized set of criteria, used to evaluate the performance of the three teams under this study, consists of fourteen indicators, distributed across the four perspectives in the Balanced Scorecard, and is as follows (the source of data is mentioned in parentheses for each criterion):

- Innovation and Learning Perspective
 1. Overall employee satisfaction regarding opportunities for development and innovation. (questionnaire)
 2. Average development time per new product release. (company data)
 3. Annual research and development expenditure. (company data)
 4. Investment in staff training and development. (company data)
- Internal Business Perspective
 1. Average decision-making time. (questionnaire)
 2. Efficiency of processes for review and approval of innovation proposals. (questionnaire)
 3. Accessibility to environments and development tooling. (questionnaire)
 4. Average level of initiative for process, or product innovations on an employee basis. (company data)
- Customer Perspective
 1. Customer satisfaction rate (NPS [Net Promoter Score]: -100 to +100). (company data)
 2. Dynamics (increase/decrease) of the number of customers, year-on-year. (company data)
 3. Marketing expenditure. (company data)
- Financial Perspective
 1. Total operating expenditure. (company data)
 2. Year-on-year net sales growth. (company data)
 3. Net profit. (company data)

In the **second stage** of the study, questionnaires were used to qualitatively and quantitatively measure a number of factors in the areas of the Innovation and Learning Perspective and for the Internal Business Perspective, which are necessary for evaluation according to the Balanced Scorecard.

The **third stage** examines the criteria relating to the Customer Perspective. The focus is on three indicators: customer satisfaction rate (NPS - Net Promoter Score: values from -100 to +100); customer dynamics (increase/decrease) on an annual basis in %; marketing expenditure.

In the **fourth stage** of the study, the last essential part of the Balanced Scorecard is examined - the financial perspective. This is the final portion of data that, which when intersected with what we know so far, would give us a clearer perspective on the relationship between the leadership and the performance of the teams.

3. RESULTS

In terms of positioning the team leaders on the Management Grid, the Team Leader A stands out as being positioned in the "Team Management" quadrant. The leader of Team B is on the borderline between "Impoverished Management" and "Authority-compliance Management", and the one of Team C is in the "Impoverished Management" quadrant.

Table 1 presents the summary information and the specific values of the examined indicators in the Balanced Scorecard. For each of them, the most favourable value is bolded.

At first glance, it is striking that the team with the most leading scores in the criteria is Team A. In the Innovation and Learning perspective, it has: the highest overall satisfaction in terms of development and innovation opportunities; the lowest annual research and development costs; and the highest investment in staff training and development. It lags behind only in the indicator of average development time for new product releases.

In the Internal Business Perspective, due to the specific situation in the company, the leaders do not have the ability to significantly influence the criteria Average decision-making time, Efficiency of processes for review and approval of innovation proposals, and Accessibility to environments and development tooling. However, they have a key role for the indicator Average level of initiative for process, or product innovations on an employee basis. The difference between departments A and B is small (0.19 vs. 0.17), but Team A's score is almost three times that of Team C, at 0.07. This enables us to conclude that the leaders of Team A and Team C have succeeded in creating a positive environment in this department and people feel on the one hand, interested and involved and, on the other hand, sufficiently free and confident that their suggestions would be listened to and considered by the management.

Looking at the Customer Perspective, we see a significant lead of about fifteen points on Team A's customer satisfaction rate (NPS). We could interpret and explain this by higher employee motivation, manifested in more attention to the quality of the products, and services they provide. Their level of commitment would not be so high if their leader failed to motivate them properly, or failed to help them grow enough, or failed to make them associate themselves fully with the team, the company and its goals.

Given the internal specificities of the company, we consider the other two factors in the Customer Perspective to be irrelevant to the study as they are not directly dependent on the actions and qualities of the leaders of the respective teams.

The final Financial Perspective, and the results in it, contributes to a quite distinct picture of the effectiveness of the studied departments. Apart from the small lead of Team B over Team A in the Year-on-year net sales growth indicator - 5.83% vs. 5.1%, the values for the other two criteria Total operating expenditure and Net profit are entirely in favour of Team A, and with a significant lead of 13% and 23%, respectively, over the department with the next result.

From the values of the indicators presented in the Balanced Scorecard, it is easy to conclude that Team A is more efficient than the teams B and C. With fewer costs, it achieves higher profits while its customers are more satisfied. Its members are more committed to the company's goals, more motivated, more prepared and operate in a more productive environment. In addition, we found the positive impact on motivation, commitment and higher performance of employees placed in an environment with more explicit care for the people.

Table 1. Balanced Scorecard results of teams A, B and C

Innovation and Learning Perspective	Team A	Team B	Team C
Overall employee satisfaction regarding opportunities for development and innovation	2.66	2.21	2.13
Average development time per new product release (days)	182.00	189.33	169.67
Annual research and development expenditure (million EUR)	1.43	1.89	1.69
Investment in staff training and development (per person in euros)	1126.33	865.67	881.67
Internal Business Perspective			
Average decision-making time	2.29	1.59	1.88
Efficiency of processes for review and approval of innovation proposals	2.31	2.04	2.14
Accessibility to environments and development tooling	2.94	2.75	2.79
Average level of initiative for process, or product innovation on an employee basis	0.19	0.17	0.07
Customer Perspective			
Customer satisfaction rate (NPS: from -100 to +100)	54.33	40.00	37.67
Dynamics (increase/decrease) of the number of customers, year-on-year (%)	6.90	4.93	8.17
Marketing expenditure (thousand EUR)	210.00	214.33	201.33
Financial Perspective			
Total operating expenditure (million EUR)	1.75	2.25	2.02
Year-on-year net sales growth (%)	5.10	5.83	4.23
Net profit (million EUR)	8.76	5.36	6.73

Source: Author's research

4. DISCUSSIONS

The outcomes of this study confirm and amplify those of earlier research works (Mollah, Choi, Hwang, & Shin, 2023; Yukl & Gardner, 2020; Nandasinghe, 2020) that highlight the link between digital leadership and sustainable organizational performance, observing its pervasive influence across organizational echelons, from top managers, through leaders, to employees.

The environment in which the study was conducted, and the teams examined, were intentionally chosen to allow for the evaluations to be done based on common grounds. The three teams are part of the same company, in the same department, reporting to the same management line. They are also comparable by size, talent, competences, responsibilities and products they develop. This allows one to state with a high degree of certainty that as most of the other important variables are virtually equalised, the leadership is the major distinguishing factor, causing the Team A to outperform the other two.

The results from the Balanced Scorecard show clear correlation between criteria related to employees' personal growth, their own perceived value, and the customer and financial ones, which on the other hand, are of utmost importance for the company's performance and overall wellbeing. Another important quality of the successful digital leader surfaces through the Internal Business Perspective of the Balanced Scorecard. It shows that it is not enough for the leader to be a good visionary and a good presenter only, but also they must be a good facilitator, who eases everyday work and successfully copes with interpersonal and inter-team challenges.

Examining the situational details further, taking into account the digitalised and virtualised environment in which the teams operate, it becomes clear that having a leader with people-oriented skills is crucial for an organisation with ambitions to thrive in the digital era. The lack of "proper" human-to-human contact takes each employee's needs of motivation in a different dimension. If in a standard physical office environment, it could be possible for an authoritarian leader to prosper through stricter local control, in a virtual environment that is practically impossible. Thus, for a leader to be successful in that new realm, they must put more emphasis to boost the natural motivation forces within the people by demonstrating sincere care, by listening and taking into account their needs, their growth aspirations, and by listening to what is important for them, what are their views on the processes, tooling, and different other aspects of their shared endeavours. I.e., the leader should foster a culture in which the employee would perform well out of the natural urge to pay back for the good deeds they are an object of. In the digitalized company, as Bass and Riggio (2005) state, the leader have to foster a culture of continuous learning and collaboration as digitalization requires constant adaptation and innovation. It also requires leaders to empower employees by encouraging their creativity and active participation in the digital transformation process.

5. CONCLUSIONS

In different types of organizations, performing different activities and having different levels of employee education and intelligence, the most appropriate and the most prevalent leadership styles are different. If people's motivation and commitment are considered as one of the major factors of the organizational effectiveness, we can come to the conclusion that in digitalised organisations, where the teams are similar to the ones in the study, which perform intellectual activities, and where presumably the members have a relatively high IQ, the most successful leadership styles would be those, based on a balanced concern for people and goals, where there is direct, honest and open communication, and the perceived power distance is small.

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ATTACHMENT AND FORMING OF IDENTITY

Emilija Marković^{1*}, Nataša Lazović², Kristina Cvetković³

¹Teacher's training faculty in Prizren - Leposavić, Serbia, e-mail: emilija.markovic@pr.ac.rs

²State university of Novi Pazar, Serbia, e-mail: nlazovic@np.ac.rs

³Faculty of Philosophy in Pristina with temporary headquarters in Kosovska Mitrovica, Serbia,
e-mail: kristina.randjelovic@pr.ac.rs



Abstract: Identity represents the sense of wholeness of one person, sense of continuity in one's behavior instead of different changes that are occurring inside an individual or around it. The identity consists of cognitive and emotional aspects of an individual and its self-perception about what happens „inside me” and what differ me from other people. Self-perception is developing under the influence of the environment, cultural factors and agencies in the process of socialization and it is the basis of our self-regard as once evaluation of one self. For developing of identity the most important period is adolescence, but we can find the roots in early childhood. For Ericson, in the period before adolescence, in different periods of childhood and early youth a person has to resolve different crises to develop the sense of autonomy, thrust, individuality ect. Globally, the results of identity development can be positive identity outcomes or foreclosure. Those identity development results primarily depend on socio-emotional factors where the great importance belongs to early interaction with caregivers and the mother on the first place. The sense of trust that is developing in the early childhood will result in the secure socio-emotional status and perception of one self and other persons in the environment as positive and reliable. On the other side, early developed sense of insecurity will probably result in the tendency of avoidance. So, consequences of those early interaction will influence characteristic affective style of one person which is related to self-regard and is the part of one's identity. The aim of this article is to analyze the role of attachment and its importance in forming of an identity which is the basis of our interactions, our feeling of controlling or being controlled, our emotions, attitudes and behavior. Understanding the interplay between these aspects helps us comprehend the complexities of human development.

Keywords: attachment, identity, early childhood

Field: Humanities

1. INTRODUCTION

Identity formation is a process where adolescence plays a crucial role, although its origins are rooted in early childhood. This process is influenced by societal factors and various social figures, with the final outcome of identity being shaped by these influences. Attachment relates to feelings of safety or threat, generally linked to a sense of security. The most significant social factors in identity formation are parental figures, with the mother being the primary figure initially, followed by the father (in most cases). Their involvement in child development begins in early childhood. Some authors (Dallos, 2003) emphasize a hierarchy of attachment based on who primarily cares for the child. According to Bowlby (1988), attachment refers to the quality of the specific relationship between the mother and child in early childhood, which endures throughout life and affects other relationships. Identity formation impacts subsequent intimacy development (Marcia, 2009). Thus, the emotional patterns of feeling secure or insecure, loved or unloved, become integral to one's identity and influence behavior and overall life. Different attachment styles—secure, anxious, or avoidant—affect how individuals interact with others and perceive themselves.

2. IDENTITY

Identity refers to the feeling of wholeness and continuity of oneself over time, despite varying circumstances and changes across different periods and environments (Erikson, 2008). The formation of identity is a dynamic process aimed at achieving relative stability. It begins in childhood, continues through adolescence, and culminates in maturity. Identity is closely linked to self-perception and comprises two main types: personal and social identity. Social identity involves defining oneself as part of a social group, answering the question “Who are we?” In contrast, personal identity pertains to defining oneself at the individual level, answering the question “Who am I?” (Van Doeselaar, 2020, p. 9). Personal identity represents how one's self-perception relates to others within the same social group, while social identity refers to aspects of self-perception that are shared with members of the same group and distinguish

*Corresponding author: emilija.markovic@pr.ac.rs



oneself from members of different groups (Arnold et al., 2005). Social identity is based on the values and emotional significance of a particular group and derives from one's membership in that group (Taylor et al., 2003). According to social identity and self-categorization theories, as shared social identity becomes more salient, individual self-perception can become depersonalized (Turner et al., 1992). There are at least two types of social identities: global and specific role identities (Leonard et al., 1999). Global social identity is forming very early in family as the primary social group, is consisting of values, traits, competences which were reinforced in that environment and influences on the choice of the group to which one would belong in adulthood. This identity expresses in all roles, all situations in relation to different social groups. Identity of specific roles derives from global one and consists of identities which are expressing in specific referent groups or social roles such as work identity, identity of parent, family member, student, friend ect. So, for each social role or social status there is identity attached to it which is present in specific interaction what means that self and identity are not the same one but self is the basis of identity (Cinoglu & Arıkan, 2021).

The period of adolescence during which individuals analyze and experiment with different roles is referred to by Erikson as a psychological moratorium (Erikson, 2008). During this period, the degree of emotional conflict varies among individuals and can influence identity formation. The central aspect of identity formation is the identity crisis, which can be resolved in two ways: identity synthesis, leading to the development of self-constructed values, ideals, and goals, resulting in a consistent sense of self over time and often accompanied by high self-esteem, a sense of self-control, and purpose in life; and identity confusion, where the crisis persists, leading to mood changes, rebelliousness, and difficulty forming close and intimate relationships (Gandhi et al., 2019). Typically, adolescents undergo a transformation towards independence (Al-Zoubi, 2020). They strive to ensure that their self-perception aligns with significant others' perceptions of them and seek confirmation that their behavior is consistent with their identity (Cadely et al., 2018). Failures in establishing identity during this period can lead to self-doubt and role confusion, which may result in a lack of personal integration, unclear identity, and subsequent psychological disturbances.

Based on Erikson's theory, Marcia (Marcia: Rice, 2001) defined four identity statuses which are ways of dealing with identity issues in late adolescence: Identity achievement is the most advanced developmental status, where the individual has navigated through a period of crisis, explored various alternatives, made strong commitments, and developed an internal locus of control. Moratorium precedes identity achievement and is characterized by active exploration of alternatives, during which individuals are not yet ready to make decisions or accept obligations. Foreclosure represents a lack or minimal amount of exploration, resulting in commitment to values and ideologies that are not the result of personal searching but are instead adopted from parents or other early reference figures. This status is often accompanied by an external locus of control. Identity diffusion applies to individuals who are not committed to any definite direction in their lives, including aspects such as occupation, religion, political attitudes, or personal criteria for behavior.

Not all identities are equally adaptive. The most adaptive identity is that of achievers, characterized by a strong sense of meaning in life, general well-being, high levels of ego development, self-esteem, moral reasoning, and self-respect (Schwartz et al., 2011). In contrast, individuals with a foreclosure identity may exhibit symptoms of depression and anxiety, as they often become defensive and display high levels of authoritarianism, obedience to authority, stereotypical thinking, an external locus of control, and dependent relationships with significant others (Kroger, 1993). Meanwhile, those in a moratorium status may experience increased self-knowledge but also significant levels of confusion, anxiety, and depression (Schwartz et al., 2011).

3. ATTACHMENT

The term "attachment" was first introduced by John Bowlby. Before Bowlby, the psychoanalytic approach described the emotional connection between a mother and child as emotional dependence, which was seen as deriving from the process of forming object relations.

Attachment refers to the specific relationship which is developing between primary caregiver (most often it is mother) and a child in earliest childhood and lasts through the whole life as the permanent psychological connection between two people (Holmes: Stefanović-Stanojević, 2015). For Lafreniere et al. (2008) attachment is strong emotional connection which provoke feelings of happiness, pleasure and security in the presence of caregiver and anxiety and fretfulness in their absence. So, here we have very strong connection and such relationship, once formed, further influences different social interactions which a person realizes as adult in life. Early interactions with primary caregivers shape internal working models

(IWMs) of self and others. These models are cognitive frameworks that influence individuals' expectations and behaviors in relationships throughout their lives. Caregivers who are available and responsive to the child's needs, establish a predictable routine and provide a stable environment, validate the child's feelings and experiences, empathize with the child and acknowledge their emotions, offers support and guidance during exploration, represent a safe haven if children wish to return when they need acceptance, are the caregivers who will most probably raise a child with secure attachment (Lazović, 2022).

Among adults, such emotional connection appears in the form of friendship and intimacy (Kim, 2005). The level of intimacy depends on primary formed patterns of attachment. The ways individuals' approach to the relationships through their lives, reflect the level of security or insecurity that they bring from relationship with primary caregivers. Insecurities are related to feeling of dependence in relationships or avoiding of intimacy (Cadely et al., 2018). One of the key factors that mediates in this process is the way of communication of parents with children which can be unfolding on different levels of freedom or restrictiveness, and this is the reason why some children grow up healthy and other with disturbance (Bowlby, 1988).

There is accordance between different authors that child can develop three patterns of attachment styles: Secure, avoidant and anxious/ambivalent attachment style. Secure attachment style derives from consistent response from the parents who provides reassurance and comfort for child, so the child can predict parent's reactions and express its own emotions (Dallos, 2003) and have the feeling of acceptance (Stefanović-Stanojević, 2015). We can assume that identification with such parents and introjections of such pattern will develop ability for predicting events in social contacts and to acquire wider range of emotions with mostly positive emotions. Secure attachment results in self-confidence, confidence in others and readiness for intimate relationships (Al-Zoubi, 2020). As adult, such persons are open for communication, exploration, growing and developing, becomes autonomous personalities ready for taking risks and able to struggle with life problems (Stefanović-Stanojević, 2015). Avoidant attachment style belongs to people who feel uncomfortable in close relationships and have fear of failure in intimate relationships (Feeney, 2008). As children, such persons have experienced that parent was not available and instead of the child's attempts to gain closeness, they were rejected, where the child attempts to disregard the need for attachment by withdrawing into non-social situations (Dallos, 2003). As adults such persons become rigid, defensive, distrustful, closed and turned to material achievement in the aim of keeping positive self-image (Stefanović-Stanojević, 2015). Anxious/ambivalent attachment style represents individuals who seek closeness while simultaneously fearing rejection (Feeney, 2008). This style derives from child's experiences of inconsistent presence and responding of parents when child display distress. If this state lasts for extensive period of time, other features of surrounding can become associated with feelings of fear and anxiety resulting in dominantly negative feelings (Dallos, 2003). As adult such persons become dependent on others, blocked by anger, offensive in social relationships, burdened with unresolved conflicts, insensitive for other's needs (Stefanović-Stanojević, 2015). Each of these attachment patterns tends to persist, but persistence is not necessarily guaranteed. There is evidence that when a child's attachment with their mother and father differs, and when parents treat the child differently, attachment patterns may change depending on the parent involved (Bowlby, 1988). Recent research has shown that if a child does not form a secure attachment with primary caregivers, there is a possibility that secure attachment can be established with another figure during development, such as a teacher, or a member of the extended family (Lazović, 2022).

4. THE ROLE OF ATTACHMENT IN FORMING OF IDENTITY

One of the main settings of attachment theory was that there is powerful influence of the way the child is treated by its parents, especially mother figure, on child development (Bowlby, 1988). This means that a significant role in forming and facilitating identity development belongs to the support and encouragement from the environment, particularly from family and other reference groups (Bosma & Kunem: Al-Zoubi, 2020). The more of support and encouragement, the more of identity stability. Every child forms its working models as frameworks for relationships with significant others based on past experiences with them about their responsiveness and availability, and these models help children to predict and interpret behavior of attachment figures (Delgado et al., 2022). These internal working models consist of expectations about the self and others and become integrated into the personality, guiding future social relationships. Some authors (Cumming & Davies; Harlow, 2021) stress that internal working models are dynamic and subject to change, and that the potential for change can be found outside of primary dyadic relationships.

People with different attachment styles perceive themselves in different ways, which influences

the knowledge component of self-concept (Wu, 2009). Psychological identity is influenced by attachment as the social factor. Attachment influences a child's physical, neurological, cognitive, and psychological development by providing a fundamental sense of trust or mistrust, which further affects future relationships with the world, social interactions, and other behavioral patterns. (Crouch, 2015). When a person of any age feels secure, this provides a strong basis for exploring their surroundings, based on the relationship with attachment figures from their childhood. "The presence of an attachment control system and its linking to the working models of self and attachment figure(s) that are built in mind during childhood are held to be central features of personality functioning throughout life" (Bowlby, 1988:123). Marcia (Marcia; Putri & Kusumaningrum, 2023) emphasizes that identity formation begins at birth and is shaped by the child's interactions with their mother and other family members, influenced by several factors, including: the level of identification with parents during childhood and adolescence; parenting style; the presence of a role model; social expectations related to identity alternatives and choices among family, peers, and other environments; the child's openness to different identity alternatives; and the level of personality development in pre-adolescence, which forms the foundation for addressing identity issues. During childhood and adolescence, friendships as a form of peer attachment become the environment for social comparison, the development of social competencies, and the formation of self-esteem (Delgado et al., 2022).

Edmon (Edmon; Al-Zoubi, 2020) has outlined five processes in identity formation: distinguishing between the self and the external world, based on the child's ability to recognize bodily sensations and emotions; imitation, which occurs when a child observes and begins to replicate other models; narcissistic encouragement, deriving from the emotional support provided by the environment and primary family; the acquisition process, which involves the progression of self-awareness and the stabilization of feelings independent of various experiences and roles; and the achievement process, which entails an individual's openness to future experiences and activities. These processes are essentially related to the internalization of communication patterns. Attachment, which initially characterizes the relationship, gradually becomes an inherent quality of the child as they grow older. The child then attempts to apply these internalized communication patterns in interactions with others, such as peers and teachers (Bowlby, 1988). So, children with secure attachment are generally cooperative, popular, and resilient, while children with avoidant attachment are often emotionally unstable, hostile, or antisocial. Children with anxious attachment, on the other hand, frequently seek attention, are easily frustrated, impulsive, and feel helpless.

Many studies have found a relationship between attachment styles and the formation of identity. In general, children with sensitive and responsive parents tend to develop healthy personalities with stable identities, while children with insensitive, unresponsive, neglectful, or rejecting parents may develop vulnerable, unstable personalities with weak or confused identities (Bowlby, 1988). Park et al. (2004) found that secure attachment is associated with an achieved identity and that securely attached individuals exhibit greater independence from external validation. In contrast, insecure attachment styles are related to lower self-esteem, suggesting that individuals with insecure attachments view themselves as having little value and feeling worthless (Bartholomew & Horowitz; Wu, 2009).

At the pinnacle of attachment dynamics within a psychologically healthy personality is the attainment of intimacy. True intimacy involves "willingness to risk the ego-synthesis of the identity stage to form new, joint identity with another person." (Franz & White, 1985: 235). For the same authors, a precondition for intimacy with others is having intimacy with oneself, which includes a sense of security in one's own identity. If an individual's internalization of their caregivers' behavior is positive and they develop a positive self-representation, it is highly likely that the individual will trust that others love and care for them and will actively seek social support and intimacy (Griffin & Bartholomew, 1994). Those with a negative self-perception are often anxious and ambivalent in their relationships with others. If they do not trust others, they may develop a tendency to avoid interpersonal relationships (Hazan & Shaver, 1987). Berman et al. (2006) found that achieved and foreclosed identities have a weak relationship with anxiety and avoidance attachment styles, while diffuse identities, and especially moratorium status, have a stronger relationship with these attachment styles. Putri and Kusumaningrum (2023) found a link between peer attachment and foreclosure identity, explaining that adolescents with a foreclosure identity tend to follow their parents' opinions, are obedient, exhibit minimal antisocial behavior, and maintain good relationships with their peers. In the context of dating, Pitman et al. (2012) found that avoidant attachment was negatively correlated with identity exploration, while anxious attachment was positively correlated and associated with greater situational exploration. Brennan et al. (1998) stated that anxious orientation is associated with a dependence on and valuing of closeness with romantic partners, even at the risk of losing one's sense of self. In contrast, individuals with avoidant orientation resist forming close relationships with their

partners despite a desire for intimacy, due to fears of rejection or loss of independence. In one study, in a sample of middle childhood children it was found that peers can be ad hoc attachment figures (Lazović, 2022). Itsna et al. (according to Putri & Kusumaningrum, 2023) found that peer acceptance and support can help adolescents feel more valued and loved by their surroundings and contribute to the formation of a positive self-identity. Thus, peer opinions can influence identity formation.

5. CONCLUSION

The intricate interplay between attachment styles and identity formation underscores the profound impact of early relationships on psychological development. Attachment theory highlights that the quality of early interactions with primary caregivers significantly shapes one's self-concept and interpersonal dynamics. Secure attachment fosters a robust identity, characterized by self-confidence and stability, while insecure attachment styles—such as avoidant and anxious—can lead to challenges in self-esteem and relationship patterns. The dynamic nature of identity formation, influenced by attachment experiences, emphasizes the importance of both early and ongoing social interactions in shaping personal and social identities. Research indicates that individuals with secure attachments are more likely to achieve a coherent identity and exhibit healthier psychological outcomes, while those with insecure attachments may struggle with identity confusion and interpersonal difficulties. The evolving nature of internal working models suggests that while early experiences are foundational, positive relationships later in life can foster change and growth. Furthermore, peer relationships and social contexts play a critical role in reinforcing or challenging one's identity. Thus, a comprehensive understanding of attachment and identity formation can inform interventions aimed at promoting psychological well-being and healthy relational patterns. Future research should continue to explore these relationships to enhance strategies for supporting individuals across different stages of development.

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CENTRAL FIGURES OF THE SERBIAN SOCIALIST MOVEMENT AND THEIR IMPACT ON EDUCATION AND CHILDBREARING AT THE TURN OF THE 19th AND 20th CENTURIES

Aleksandra M. Patrić^{1}, Jasna Lj. Parlić-Božović¹, Tamara M. Dobrić¹*

¹Faculty of Philosophy of the University of Priština in Kosovska Mitrovica, Serbia
e-mail: aleksandraandric56@gmail.com, jasna.parlic.bozovic@pr.ac.rs,
tamara93dobric@gmail.com



Abstract: During the end of the 19th and the beginning of the 20th centuries, the childrearing and education of children, young people, and adults in Serbia was influenced not only by the working class, but also by the state and political parties in power. In this paper, we will examine the lives of notable figures of the Serbian socialist movement, their perspectives on parenting and education, as well as their contributions to adult education and their useful pedagogical and andragogic activities. The historical interpretations of that period served as valuable source for researching the socio-political and economic situation, while the scientific-theoretical influences were analysed with the help of the pedagogical teachings of the most influential educators of the day. The primary focus of this paper is an examination of the ideologies and biographies of the prominent figures in the Serbian socialist movement. The analysis includes Svetozar Marković, Vasa Pelagić, Dimitrije Tucović, Radovan Dragović and Dušan Popović, who played a crucial role in the development of educational concepts and practical pedagogical and andragogic practices. The goal of this paper is to investigate the influence of prominent Serbian socialist movement leaders on the upbringing and education of children, youth and adults in Serbia during the end of the 19th and the beginning of the 20th century. Their perspectives on education and parenting, adult education and learning, and their practical pedagogical and andragogic work in the labour movement of Serbia during the first decades of the 20th century will be all included in the research. The study's findings demonstrated how the ideas and efforts of influential members of the Serbian socialist movement influenced the formation and reform of educational systems, both for children and youth, and for adults.

Keywords: Serbian Social Democratic Party, Svetozar Marković, Vasa Pelagić, pedagogical studies, activities related to pedagogy and andragogy.

Field: Social Sciences

1. INTRODUCTION

The late 19th and early 20th centuries represent an important turning point in the history of education in Serbia, when the social, political, and economic landscape underwent tremendous upheaval. Education and childrearing were profoundly impacted by socio-political and economic changes. During the 19th and 20th centuries, institutional education played an important role in spreading knowledge and raising the population's literacy rate, influencing cultural and political development and enabling the lowering of societal inequality (Mrvoš, 2022, p. 13).

The state of Serbian society at that time was the result not only of internal changes but also of external factors, including the actions of the working class and the ruling political parties. During that time, the education and upbringing of children, youth, and adults were influenced not only by governmental institutions and political parties, but also by the labour movement, which was becoming more and more powerful. The socialist movement, particularly its prominent representatives, greatly influenced the concepts of education and childrearing that developed in Serbia.

This paper will investigate how central figures of the Serbian socialist movement, such as Svetozar Marković, Vasa Pelagić, Dimitrije Tucović, Radovan Dragović and Dušan Popović, influenced the advancement of childrearing and education in Serbia. Their views on parenting, adult learning and the value of practical work in education remain significant for comprehending how social and economic factors shaped educational policies and practices of the time. In order to give a thorough understanding of the socialist movement's impact on education in Serbia, and to show how their ideas influenced the evolution of the educational system during one of the most important periods of Serbian history, this paper will analyse the biographies of these notable individuals as well as their pedagogic and andragogical concepts.

*Corresponding author: aleksandraandric56@gmail.com



2. RESOURCES AND TECHNIQUES

The primary data source for this paper's examination of the sociopolitical and economic climate at the close of the 19th and the start of the 20th centuries will be historical analysis. In addition, we will rely on the pedagogical teachings and theories of the leading educators of that time in order to analyse scientific-theoretical influences. The analysis will include the study of biographies and pedagogical concepts of significant socialist movement leaders, as well as their influence on adult education and practical pedagogical-andragogic labour movement initiatives of Serbia.

3. RESULTS

3.1. SVETOZAR MARKOVIĆ, THE FOUNDER AND LEADER OF THE SOCIAL DEMOCRATS IN THE 19TH CENTURY AND HIS PEDAGOGICAL AND ANDRAGOGIC IDEAS

In philosophy, truthfulness implies utility and practical application, particularly in the context of pragmatism. In this sense, something is true if it is useful. The question is not whether something exists, but whether it has practical value, although the influence of utilitarianism and pedagogical ideas had shaped the pragmatic views of Svetozar Marković in the areas of childrearing and education (Đorđević, 1977, p. 97).

Marković engages in journalistic endeavours to introduce young people in Serbia to contemporary scientific and social realities while cultivating his critical thinking skills. He defends realistic and socially conscious literature while criticising idealised aesthetics in the 1868 piece *Pevanje i mišljenje* ("Singing and Thinking") (Đorđević, 1977, p. 11). Marković makes the point that literature ought to reflect genuine life based on contemporary science and be beneficial to society (Marković, 1987, p. 174).

According to Marković, the issues that young people face are a reflection of the social and scientific environments of their day. Whereas psychology views youth as a component of biological-psychological development, conservative classes frequently view youth as an issue of education (Đorđević, 1977: 12). Marković emphasises the necessity for enlightenment and education for young people as well as the need to alter the societal structures that gave rise to the current state of affairs. He contends that prioritising the people's freedom over other endeavours is essential. (Marković, 1987: 104). In terms of education, Marković believes that the school should prepare people who can both provide adequate parenting and make up for deficiencies of home schooling (Marković, 1987, p. 135). He is critical of teaching methods that prioritised mechanical learning above the growth of critical thinking (Marković, 1987, p. 118). Marković distinguishes three aspects of education: physical, mental and moral. While physical education involves raising children both in the home and in specialised facilities, mental education is the responsibility of the school. He believes that mental education should be connected with manual work, and that moral education comes primarily from social interactions (Parlić-Božović, 2011, p. 47).

Marković divides school education into general and special. General education is mandatory for everyone, while special education depends on individual abilities. He proposes that teaching programmes be modified to better meet the needs of students, criticising the system of student categorisation which does not account for individual disparities in ability (Đorđević, 1958, p. 45). Marković makes the argument that social skills, empathy, and the capacity to function in society should all be developed via schooling (Đorđević, 1958, p. 45). Research on his legacy has focused on the education of children, while his social views and the interaction between work and education have received less attention. Marković emphasizes that education is crucial for the development of society and humanity and that only in the 20th century was this proven (Savićević, 2000, p. 272).

The first request for the introduction of manual labour in the curriculum came from politicians Svetozar Marković and Vasa Pelagić (Đorđević, 1958, p. 45). Towards the end of the 19th century, manual labour was expected to revolutionise elementary education as a reform movement. Manual labour was supposed to "regenerate society and create a new generation with more sense for practical life," according to the historian (Đorđević, 1958, p. 45). This movement was a response, pedagogically speaking, to verbalism and formalism-heavy, out-of-date teaching. Marković believed that "the most important moral issue is the problem of will," and that "complete mastery of his freed thought and his strong soul" characterise the ideal man. (Marković, 1987, p. 104). He wanted friends who "have their own opinion, who act according to their conviction" (Marković, 1872, p. 105), and he despised the weak and pliant. His criticism of the school was centred on the necessity of social changes, since he believed that "the transformation of school systems is impossible without material and economic transformation," (Marković, 1966, p. 280). Marković believed that the development of both the individual and society depended on education. He supported

"lifelong education", which proved popular in 1960s (Savićević, 2000, p. 272). He contends that education encompasses more than just schooling and comes from reading, attending public lectures, and other sources (Marković, 1872, p. 272).

Despite his criticisms of the current educational system, Marković never separated education from social needs. He underlined that "the revolution's function is education and learning" and that it's critical to "adopt knowledge that helps to break the power of the enemy" (Marković, 1987, p. 7). He also believed in the "dialectical unity of general and professional education" (Marković, 1966, p. 49), and believed that education should be versatile, with an emphasis on general education, which is a "general national need" (Marković, 1966, p. 50). Marković emphasized the significance of education for the development of both the individual and society, considering that "the development of general national strength and the development of individual strength - these are two sides of the same coin" (Marković, 1987, p. 115). He argued that education fosters the growth of one's physical and mental abilities, which boosts one's capacity for production (Marković, 1987, p. 172). According to Marković, "worker education is the most important thing" for productivity, and "social structure" influences how workers develop (Marković, 1966, p. 235). He contends that the foundation of society's material and cultural enrichment is education (Savićević, 2000, p. 278).

Marković draws a connection between the growth of the manufacturing and machine industries with education, highlighting the drawbacks of the division of labour, which lowers worker skill and knowledge. The reduction of mental and physical demands resulting from work simplification in mechanical production reduces work to "the consumption of simple mechanical power" (Marković, 1966, p. 250). He advises switching jobs and pursuing other career paths to prevent "a living man becoming a dead device tied to a machine" (Marković, 1966, p. 262). Diverse employment strengthens the worker's mental strength and does not lead to "spending as if doing one job" (Marković, 1966, p. 260).

Marković warns that the oral transfer of knowledge does not guarantee its acceptance and stresses the need to research how novelties affect people, which is a contemporary approach to adult education and learning (Savićević, 2000, p. 280). His socialism is intellectual in nature, viewing the intelligentsia as the main agent of change. He believes that intelligentsia will enable the realisation of democratic principles (Marković, 1966, p. 91). According to Parlić-Božović, Marković was exceptional in his investigation of youth issues and methods of their education from revolutionary positions (Parlić-Božović, 2011, p. 48), and he is considered "a great fighter of our progressive pedagogy". In economically underdeveloped Serbia, where social classes had just started to emerge, his socialism was intellectual and ethical, because it could not be any other way (Skerlić, 1966, p. 153). For entire generations of Serbian intellectuals and politicians, regardless of whether they supported left or right political ideas, Svetozar Marković was a kind of teacher, despite the fact that he was only 29 years old when he died. The most famous examples are Jovan Skerlić and Nikola Pašić. Marković was also the primary ideological rival of Milan Obrenović and the pro-Western ruling elites (Mirović, 2019, p. 231).

3.2. PEDAGOGICAL AND ANDRAGOGIC IDEAS OF VASA PELAGIĆ

In an effort to strengthen social order in Serbia, Pelagić proposes new laws and a constitution that would guarantee equal rights and duties to all citizens. Every legal and constitutional provision, in his opinion, ought to be a component of a social contract that ensures political, educational and economic equality (Pelagić, 1983, p. 104). Additionally, he suggests that a law would become enforceable if it is signed by two-thirds of the people's deputies, without the need for the signature of the government and the ruler (Pelagić, 1983, p. 104). Pelagić believes that every adult citizen ought to be able to vote and exercise their political rights. Elections for people's deputies should be held on Mitrovdan (St Demetrious day, 08.11.), and the assembly should meet on Arandjelovdan (the Synaxis of Saint Michael the Archangel, 21.11). Only the National Assembly has the authority to grant pardons and amnesty. Ministers and other leaders must have previously worked with the people as teachers or farmers, and their salaries cannot exceed six thousand dinars (Pelagić, 1983, p. 10). The army ought to be disbanded and replaced with a system of national defense. Pensions are only paid to people who are physically and mentally exhausted. All workers will have their working hours set by the law. Doctors should be paid by the people they treat, not by the government or local government. Teachers and professors can be transferred after working in the same place for six years, unless half of their fellow citizens request otherwise. Roads and bridges should be maintained from the state treasury, and orphanages should be built everywhere to train children in trades and agriculture. The national banks of Serbia should provide loans for economic development (Pelagić, 1983, p. 10). Svetozar Marković had a big influence on Pelagić when he first entered the teaching profession in 1866 when he was hired as a teacher in Brčko. Although he was a persistent political fighter,

his education was not as extensive as Marković's. Pelagić was critical of the current educational system, which he viewed as being out of date and ineffective, and presented his ideas in the books *Preobražaj škola i nastave* ("Transformation of Schools and Teaching") (Belgrade, 1989) and *Nova Nauka o javnoj nastavi* ("New Science of Public Education") (Belgrade, 1981).

Regarding what the purpose of education should be, Vasa Pelagić was in agreement with other 17th and 18th century Serbian pedagogues. Pelagić believed that the development of new education was the primary goal of the new pedagogical science, since it is impossible to build a new school on the foundations of the old pedagogy, which he criticised for the discrepancy between pedagogical theory and practice. In the modern context, his ideas about changing the function of school and teaching are very significant and current: "It is an inevitable step towards a more radical positive change and design of the teaching process even in our time" (Pelagić, 1971, p. 192). Pelagić placed a strong emphasis on the moral component of education, expecting teachers to be role models who are truthful, fair, and compassionate (Pelagić, 1953, according to: Kovačević, 2019, p. 65). He was against punishing students and believed that discipline should be regulated normatively. He stated that all teachers who mistreated or abused their students should be removed from their positions (Pelagić, 1953, according to: Kovačević, 2019, p. 65). In his critique of the current educational system, Pelagić drew attention to the unfavorable conditions in schools that lead to severe sickness and death of students, and demanded the construction of educational facilities to be in accordance with the health science plan. He insisted that the classrooms measure 12 by 8 metres and that the old, unhygienic benches be replaced with individual seats (Đorđević, 1958, p. 58). Vasa Pelagić was a fierce critic of the existing school system and advocated reform of pedagogy. He thought that the new school required new teaching methods, and the basis for its creation was the criticism of the old methods. Pelagić believed that a new school cannot be built on the foundations of the old pedagogy, which led to conflict between theory and practice (Kovačević, 2019, p. 62-63).

The development of freedom of thought, diligence, justice, philanthropy, truthfulness, feeling of belonging, resistance to hatred, conflicts, and warfare, as well as the understanding that human life is the primary value, are, in his opinion, the most important tasks of education, because our own happiness is reliant on the happiness of those around us, and we cannot be happy if they are not (Škipina & Kovačević, 2022, p. 71). Pelagić felt that the school atmosphere must be pleasant and include time for fun and games. Pelagić was in favour of making manual labour a compulsory subject in all schools and was against rote learning. He supported the advancement of ideas in education as well as a reasonable scope of teaching (Parlić-Božović, 2011, p. 51). Pelagić was involved in the socialist movement and took part in the Bosnian uprising of 1875 as a utopian socialist. Among the few educators who addressed school hygiene, he suggested that every classroom have nine ventilators (Parlić-Božović, 2011, p. 51). In addition, he collaborated with a number of socialist newspapers and assisted in the formation of the Socialist Party of Serbia. His ideas had a great influence on the masses of working-class and peasant people in Serbia and other Balkan countries.

3.3. SECOND GENERATION OF SERBIAN SOCIAL DEMOCRATS

With a critical mindset and a strong affinity for Marxism and socialism, Dimitrije Tucović (1881-1914) will become a central figure in the labour and socialist movements in Serbia after Svetozar Marković (1846-1875). His theory and practical work began with the Marxist understanding of the liberation of oppressed and exploited classes and nations. Tucović devoted considerable attention to countering the influence of external imperial powers and establishing a Balkan federation of free states and nations (Kovačević, 2024, p. 241-242). As a political activist and teacher, Tucović actively worked on the education of the working class, organizing various training programmes to prepare workers for future challenges. He emphasized the importance of education for the progress of the labour movement, believing that progress is not possible without "valid, organized, continuous and healthy socialist agitation and propaganda" (Tucović, 1911, according to: Savićević, 2000, p. 288). He placed special emphasis on training those who will spread socialist knowledge and ideas. For this reason, he organised training programmes for union and party clerks (Savićević, 2000, p. 288). Tucović saw education as a daily necessity for the development of the labour movement, an aspect of cultural work that "never fails" (Tucović, 1911, according to Savićević, 2000, p. 289). In an effort to enable intensive educational work, he initiated the construction of the Socialist Home in Belgrade, inspired by homes in Europe.

In 1903, Radovan Dragović founded the Belgrade Workers' Society, the Social Democratic Central Committee and the Serbian Social Democratic Party. According to him, political, union, and educational organizing are not distinct processes, but rather emerge concurrently. In order to "spread awareness, strengthen mental development, develop solidarity, and gain knowledge about class position," Dragović

argued in favour of the founding of "workers' societies." These societies will eventually develop into trade unions, which will support social democracy (Dragović, 1954, according to Savićević, 2000, p. 284). Like Svetozar Marković, He also stressed that education must respond to the needs of society and the individual. Dragović believed that educational and cultural needs should be met in the same way as basic physical needs, and he saw many opportunities for workers' organizations to address spiritual needs (Savićević, 2000, p. 285). He thought that learning and education were essential to the growth of the labour movement and the liberation of workers, and that the working class should receive its education from its organizations (Savićević, 2000, p. 284). In 1903, Dragović founded the first Workers' School in Belgrade, where Dimitrije Tucović and Dragiša Lapčević also taught, and it was this model that led to similar schools being established in other cities, such as Kragujevac and Niš. Dragović took a mentoring approach to training, inviting students to his home where he would give them assignments and test them (Dimitrijević, 1954, according to Savićević, 2000, p. 285).

At the start of the 20th century, Dušan Popović was a well-known socialist theorist in Serbia. His lectures at the Social Democratic Party's political school and the popularization of socialist ideas are examples of his contribution to working-class education. Popović recognized the importance of education in transforming social relations and eliminating prejudices that stand as an obstacle to the progress of culture and civilization (Savićević, 2000, p. 291). Like his contemporaries Dragović and Tucović, Popović emphasised the importance of individual work and self-education. In particular, he made contributions to education by using the media to disseminate knowledge. As the editor of *Radničke novine* ("Workers' Newspaper"), Popović promoted literary and scientific contributions in addition to political reporting. (Savićević, 2000, p. 291).

4. FINAL REMARKS

The analysis of the life and work of Serbian social democrats reveals important theoretical assumptions from the field of andragogical theory, such as lifelong education, the relationship between education and economic and social development, the role of self-education, and the integration of work and education. Svetozar Marković was an organizer and political idea propagator who had a significant impact on young people despite not being an educator. His appeal to young people to attend teacher training schools was very successful. Marković saw education as a critical component of social development and as a lifelong process that contributes to the development of the personality by combining education with work and shortening working hours. Marković particularly emphasised the importance of women's education, self-education, and the role of innovation in assessing educational needs, which remained important in the 20th century. His pedagogical ideas were the basis of the educational initiative of Serbian social democrats, and his socialism was intellectual in nature, emphasising the intelligentsia's role as the bearers of new ideas.

The Social Democrats in Serbia followed the development of adult education in Europe and recognised the importance of national universities for the education of the working class. Considering the social, economic, and political climate in Serbia at the time, they believed that the creation of national universities would be beneficial in educating and preparing individuals for employment in labor organizations. While Pelagić promoted progressive didactic concepts, and emphasised the need to respect the nature of children in teaching, Radovan Dragović had a great influence on the development of socialist ideas and the organisation of the labour movement in Serbia. His pedagogical ideas and self-education served as successful illustrations of how socialist concepts could be applied.

The Social Democratic Party's emphasis on the need for organised and methodical self-education in order to more successfully carry out the tasks of the labour movement, led to the establishment of both domestic and foreign translated literature. Adult education was closely linked to the economic and political struggle of the working class, and Serbian social democrats were pioneers in the study of andragogical phenomena.

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AN EMPIRICAL ANALYSIS OF SUPPLY AND DEMAND FACTORS INFLUENCING GLOBAL OIL PRICES: A PANEL DATA APPROACH

Milan Tomić¹, Srđan Stevandić¹

¹Independent Researcher, Bosnia and Herzegovina,
e-mail: milantm93@gmail.com, srdjanstevandic@gmail.com



Abstract: This study examines the factors that impact global oil prices, focusing on the relationship between supply and demand in international markets. The authors used an econometric panel methodology to identify the primary factors influencing global oil prices, using Brent crude oil prices as the dependent variable. The study also considered alternative measures, such as Dubai and West Texas Intermediate (WTI) prices, as well as a composite global price index derived from the average of WTI, Dubai, and Brent prices, to ensure the robustness of the findings. The study found that key factors influencing global oil prices remained consistent across different dependent variables introduced into the model. The research emphasizes the critical role of supply and demand dynamics as the main drivers shaping global oil prices. On the supply side, variables such as oil reserves, international oil trade, and the number of active oil rigs were considered. The results indicated that an increase in active oil rigs is associated with increased oil prices, while an increase in international oil trade leads to price reductions. When oil prices rise, active oil rigs often increase, but with a specific time lag. This rig increase can further drive up oil prices, particularly when the market expects continued price growth or when investments in new rigs are financed by anticipated higher revenues from oil sales. Increased international trade in oil leads to a more excellent supply of oil in the global market, which drives down global oil prices. Although oil reserves showed a positive coefficient, they were marginally significant, suggesting a potential upward pressure on prices when reserves increase. This positive relationship between oil reserves and prices may reflect market perceptions of future supply constraints, where increased reserves signal potential future scarcity rather than immediate availability, thereby exerting upward pressure on prices due to speculative behavior and strategic stockpiling. On the demand side, industrial growth was a critical factor that significantly drove oil prices higher. At the same time, renewable energy consumption had a statistically significant adverse impact, reducing global oil demand and lowering oil prices. The study also examined the impact of major global events, including the COVID-19 pandemic and the effects of the Global Financial Crisis. It revealed that the COVID-19 pandemic had a statistically significant negative impact on oil prices due to worldwide lockdowns and economic slowdowns. However, the Global Financial Crisis did not exhibit statistical significance in the model using WTI prices, though it still negatively affected all models. The study employed various panel data regression techniques, including pooled, fixed effects (FE), and random effects (RE) models. Diagnostic tests for heteroskedasticity and autocorrelation were conducted, leading to the application of Robust Hausman tests that identified the fixed effects model as the most appropriate for this analysis. Moreover, the study used Driscoll-Kraay standard errors to correct for heteroskedasticity, autocorrelation, and cross-sectional dependence, which reinforced the fixed-effects model's validity. The key findings highlighted the importance of supply and demand as pivotal factors influencing global oil prices.

Keywords: oil prices, international trade, supply and demand, panel data, COVID-19, Global Financial Crisis

Field: Social sciences

1. INTRODUCTION

A complex interplay of global supply and demand factors impacts oil prices. These dynamics significantly influence oil prices, as highlighted in various studies. Effiong (2014) notes that oil price shocks can originate from both supply and demand sides in the crude oil market, indicating that supply disruptions do not solely drive oil price fluctuations but can also be caused by demand shocks. Jibril, Chaudhuri, and Mohaddes (2020) further emphasize that while oil supply disruptions have a minor and temporary effect on actual oil prices, specific oil demand and aggregate demand increases can lead to significant and lasting impacts on oil prices. Robays (2016) explores the relationship between macroeconomic uncertainty and oil price volatility, revealing that higher levels of macroeconomic uncertainty, such as volatility in global industrial production, can significantly amplify the sensitivity of oil prices to both demand and supply shocks.

Additionally, Zhu, Su, Guo, and Ren (2016) provide insights into the asymmetric effects of oil price shocks on the Chinese stock market, showing that positive oil supply shocks reduce oil prices while positive demand shocks increase prices. Jin, Zhai, and Zhu (2022) discuss various factors driving oil price increases, including oil production disruptions, unexpected global economic expansion, and expectations

¹Corresponding author: milantm93@gmail.com



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of future supply shortages, each with different effects on accurate oil prices. Nia and Aminata (2022) elaborate on the short-term effects of oil shocks, emphasizing the impact of oil supply shocks, global demand shocks, and specific oil demand shocks on crude oil prices. These findings collectively highlight the multifaceted nature of oil price determinants and the different impacts that supply and demand shocks can have on global oil prices. Yoshino and Alekhina (2019) contribute to understanding oil price determinants by developing an aggregate supply and demand model for oil to empirically assess the impacts of supply and demand factors on Brent crude oil prices. Ekong and Effiong (2015) further decompose oil price shocks using a Structural Vector Autoregressive (SVAR) model, separating them into oil supply, aggregate demand, and specific oil demand shocks. Mokni (2023) employs detrended cross-correlation analysis to identify supply shocks, aggregate demand shocks, and specific oil demand shocks among global oil prices, shedding light on the different drivers of oil price fluctuations. Understanding these various components of shocks is crucial for a comprehensive analysis of the factors affecting oil prices. Baek (2021) highlights the varied impacts of rising oil prices on external balances, depending on whether they are driven by global oil supply disruptions, economic expansions, or changes in precautionary measures due to future supply risks.

The global oil price is a complex phenomenon influenced by many interconnected factors related to supply and demand dynamics in the international oil market. Benchmarks such as Brent Crude, WTI, Dubai prices, and others play a crucial role in shaping the global economy due to the importance of oil as an essential commodity across various sectors. Studies have highlighted the critical role of oil prices in influencing the energy sector and broader economic activities, with oil price shocks affecting stock markets, real estate markets, and international trade. The complex relationships between oil prices and various economic indicators emphasize the interconnectedness of the global oil market with other sectors of the economy. In addition to Brent, WTI, and Dubai, other oil benchmarks such as the OPEC Reference Basket, Urals, Bonny Light, Mexican Basket, Tapis, and Mars provide standardized pricing and facilitate global trade, ensuring transparency in the oil market.

Based on the earlier text, we can conclude that the balance of supply and demand mainly determines the global oil price. Numerous researchers have explored the factors influencing oil prices on a deeper level, investigating the role of oil reserves (Hamilton and Herrera 2004; Askari and Krichene, 2010; Yoshino and Alekhina, 2019; Van Robays, 2012), production levels (Van Robays, 2012; Nia & Aminata, 2022), active rigs (Khalifa, Caporin, & Hammoudeh, 2017; Ringlund, Rosendahl, & Skjerpen, 2008), the adoption of renewable energy (Fattouh, Poudineh, & West, 2018; Magazzino & Giolli, 2024), trade openness (Majumder, Raghavan, & Vespignani, 2020), exchange rates (Hamilton and Herrera, 2004; Askari and Krichene, 2010; Yoshino and Alekhina, 2019; Jibril, Chaudhuri, & Mohaddes, 2020), technological advancements (Fattouh et al., 2018), industrial growth (Van Robays, 2012; Jibril et al., 2020; Nia & Aminata, 2022; Yoshino & Alekhina, 2019), and global crises like the COVID-19 pandemic and the global financial crisis (Shehzad et al., 2021; Yu, Guo, & Chang, 2022), all of which can significantly shape the dynamics of oil supply and demand.

2. MATERIALS AND METHODS

The methodology for this study involved several steps to ensure the robustness and reliability of the findings regarding the factors influencing global oil prices from 2000 to 2022. We selected this time frame precisely to capture the effects of major global events, including the Global Financial Crisis and the COVID-19 pandemic. We also created artificial dummy variables to account for these events. To begin, we presented descriptive statistics to summarize the key characteristics of the data. We then used pooled OLS, fixed effects (FE), and random effects (RE) models to explore the relationships between the independent variables and global oil prices. The independent variables included Oil Reserves, Oil Production, Active Rigs, Renewable Energy (RE) consumption, Trade Openness, Exchange Rate Fluctuations, Technology, GDP Growth, Industry Output, COVID-19, and the Global Financial Crisis. All variables in this study underwent log transformation to ensure linearity and normalize the distribution, thus facilitating more accurate econometric analysis. This study's "Trade Openness" variable explicitly measures the international oil trade level. Traditionally, trade openness is calculated as the ratio of total imports and exports to GDP. However, this analysis's calculation has been refined to focus only on oil imports and exports. This provides a more precise measure of the extent countries are open to global oil trade flows. The variable "Exchange Rate Fluctuations" represents the fluctuations of the domestic currency in relation to the US dollar. This focus is particularly relevant because oil is predominantly traded globally in US dollars, making exchange rate shifts critical in understanding oil price dynamics. The sample in this analysis includes countries from both developing and developed nations. The number of

observations in the model depends on data availability, as only countries with complete data across all variables were included in the panel analysis using STATA software.

After estimating the pooled FE and RE models, we conducted diagnostic tests to assess the presence of autocorrelation, heteroskedasticity, and cross-sectional dependence. These tests revealed the presence of both heteroskedasticity and autocorrelation within the models. Consequently, we applied the robust Hausman test, which indicated that the fixed effects (FE) model was more appropriate for the analysis than the random effects model. To address these econometric issues, we employed Driscoll-Kraay standard errors. This approach corrected for heteroskedasticity, autocorrelation, and cross-sectional dependence, enhancing the estimates' reliability and ensuring the model's robustness. We sourced data for the study from several vital databases, including the World Bank (WB), the Organization of the Petroleum Exporting Countries (OPEC), the International Energy Agency (IEA), the International Monetary Fund (IMF), and the Federal Reserve Economic Data (FRED). These databases provided comprehensive data on oil-related variables and macroeconomic indicators essential for the analysis. The dependent variable in the analysis was Brent Crude oil prices. In contrast, WTI and Dubai Crude oil prices were introduced as alternative dependent variables to test the robustness of the model. Additionally, we created a new composite variable representing the average prices of Brent, WTI, and Dubai Crude oil, offering a more comprehensive perspective on the factors influencing global oil prices from both supply and demand angles.

3. RESULTS

The summary statistics in Table 1 show the characteristics and variation of the critical variables analyzed in this study. These variables represented supply- and demand-side factors affecting global oil prices. These insights set the stage for the following econometric analysis, which investigated how these supply and demand variables interacted to influence the dynamics of oil prices. The findings of these analyses are presented below.

Table 1. Descriptive statistics of the variables used in the analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
WTIPrice	4,807	4.049	.427	3.254	4.600
BrentPrice	4,807	4.077	.474	3.19	4.718
DubaiPrice	4,807	4.032	.490	.490	4.690
MediaPrice	4,807	4.054	.463	3.192	4.654
OilReserves	2,045	18.191	2.975	11.128	24.471
OilProduction	1,932	11.858	2.863	1.791	17.046
ActiveRigs	917	2.815	1.459	0	7.602
RE	4,242	2.519	1.924	4.892	18.497
TradeOpenness	2,208	11.089	1.924	4.892	18.497
ExchRateFluct	4,519	2.766	2.743	-3.112	22.628
Technology	2,207	-.963	.679	-2.302	0
GDPGrowth	2,366	.478	.306	0	1.342
Industry	3,177	7.065	.993	0	8.063
COVID-19	4,807	.043	.203	0	1
Glob.Finan.Crisis	4,807	.043	.203	0	1

Source: Author's Calculation

This study's variables cover supply and demand factors influencing global oil prices. On the supply side, factors such as oil reserves, oil production, active rigs, trade openness related to oil, and technological advancements reflect the capacity and flow of oil in global markets, impacting availability and production efficiency. On the demand side, factors such as renewable energy consumption, exchange rate fluctuations, GDP growth, industrial output, and significant global events like the COVID-19 pandemic and the Global Financial Crisis drive consumption patterns and economic activity, ultimately shaping the oil demand. These variables offer a comprehensive view of the dynamic interplay between supply and demand in determining global oil price movements.

The regression results for the Brent Crude, WTI, Dubai Crude, and MediaPrice variables are presented in the table below. They utilize pooled OLS, fixed-effects (FE), random-effects (RE) models, and Driscoll-Kraay standard errors.

Table 2. Regression Results for Crude Oil Prices: Pooled OLS, FE, RE, and DK Models

Variable	Pooled Brent crude	FE Brent crude	RE Brent crude	DK Brent crude	DK WTI	DK Dubai	DK MediaPrice
OilReser	.052 *** (.017)	.059 (.071)	.052 *** (.017)	.059* (.017)	.076** (.034)	.093* (.061)	.090* (.046)
OilProduction	.019 (.018)	-.078 (.089)	.019 (.018)	-.078 (.064)	-.065 (.065)	-.080 (.065)	-.076 (.065)
ActiveRigs	.097 *** (.017)	.086*** (.028)	.097*** (.017)	.086*** (.024)	.066** (.026)	.087** (.024)	.080*** (.024)
RE	-.001 (.009)	-.135 ** (.067)	-.001 (.009)	-.135 ** (.041)	-.134** (.050)	-.127* (.065)	-.132** (.058)
TradeOpenness	-.018*** (.011)	-.041** (.017)	-.018 (.015)	-.041 ** (.016)	-.040*** (.014)	-.038** (.015)	-.040 ** (.015)
ExchRate	-.019** (.007)	-.506** (.076)	-.019** (.007)	-.506** (.115)	-.514*** (.096)	-.497*** (.115)	-.504** (.107)
Technology	-.178 *** (.050)	-.367*** (.092)	-.178*** (.050)	-.367*** (.094)	-.318*** (.073)	-.365*** (.089)	-.351*** (.090)
GDPGrowth	-.249 *** (.071)	.156 (.148)	-.249 *** (.071)	.156 (.114)	.119 (.111)	.152 (.114)	.167 (.113)
Industry	.091*** (.030)	.600*** (.091)	.091*** (.030)	.600*** (.128)	.588*** (.096)	.598*** (.137)	.596*** (.119)
COVID-19	-.465*** (.149)	-.233* (.133)	-.465*** (.149)	-.233*** (.082)	-.224*** (.069)	-.232** (.087)	-.223*** (.079)
Global Financial Crisis	-.018 (.052)	-.158 *** (.045)	-.018 (.052)	-.158** (.071)	-.076 (.051)	-.145 *** (.071)	-.127* (.064)
Obs	354	354	354	354	354	354	354
MODEL SIG.	F(11, 342)= 6.64 Prob = 0.000	F(11, 306)= 25.45 Prob = 0.000	F(8, 48)= 5.60 Prob = 0.000	F(11, 36)= 1326.12 Prob = 0.000	F(11, 36)= 1911.03 Prob = 0.000	F(11, 36)= 1277.35 Prob = 0.000	F(11, 36)= 1506.91 Prob = 0.000
COEF. OF DETERMINATION	R ² = 0.176 R ² _{adj} = 0.149	within = 0.477 between = 0.004 overall = 0.018	within = 0.482 between = 0.130 overall = 0.257	R ² = 0.477	R ² = 0.513	R ² = 0.467	R ² = 0.487

Note: Standard errors are given in parentheses. Asterisks indicate the level of significance: *** significance level at 1%, ** significance level at 5%, * significance level at 10%.

Source: Author's Calculation

This study used panel data to analyze the factors influencing global oil prices, focusing on Brent Crude as the dependent variable. The authors conducted multicollinearity diagnostics before the regression analysis to ensure the model's reliability. The calculated Variance Inflation Factor (VIF) values were 2.94, indicating no significant multicollinearity issues in the model. To test the robustness of the model, the authors also altered the dependent variable to include the prices of WTI and Dubai Crude oil. Additionally, they created a new variable representing the average prices of Brent, WTI, and Dubai Crude to provide a comprehensive view of the factors influencing global oil prices from both supply and demand perspectives. Autocorrelation tests were performed across the models, revealing the following results. For Brent Crude, the analysis yielded an F-statistic of 242.153, with a p-value of less than 0.000. WTI showed an F-statistic of 221.120 (p-value = 0.000), while Dubai Crude exhibited a value of 293.592 (p-value = 0.000). Similarly, for the Media Price, the F-statistic was 252.873 (p-value = 0.000). These findings indicate the presence of autocorrelation in all models. Heteroskedasticity tests were conducted using the Modified Wald test for groupwise heteroskedasticity. For Brent Crude, the chi-squared statistic was 7363.31 (p-value = 0.000). WTI yielded a chi-squared statistic of 548.04 (p-value = 0.000), while Dubai Crude showed a value of 8743.58 (p-value = 0.000). Similarly, the Media Price's chi-squared statistic was 5727.87 (p-value = 0.000). These findings confirm the presence of heteroskedasticity in all models. The authors employed the Robust-Hausman test to account for both autocorrelation and heteroskedasticity in the models. This test was used to determine whether the Fixed Effects (FE) or Random Effects (RE) model is more appropriate. The robust version of the Hausman test provides reliable and unbiased parameter estimates, effectively addressing issues of autocorrelation and heteroskedasticity within the model. The results of the Hausman test showed a chi-squared statistic of 62.53 with 11 degrees of freedom (p-value = 0.000), confirming a significant difference between fixed and random effects models. Consequently, the fixed effects model was validated as the most appropriate for this analysis, ensuring that the results are not biased by the underlying heteroskedasticity or autocorrelation. Furthermore, a cross-sectional dependence test was applied using Pesaran's method (2015). The results were as follows: for Brent Crude, CD = 33.006 (p-value = 0.000); for WTI, CD = 32.854 (p-value = 0.000); for Dubai Crude, CD = 33.281 (p-value = 0.000); and for the Media Price, CD = 32.790 (p-value = 0.000). These results indicate significant cross-sectional dependence in all models. Moreover, Driscoll-Kraay standard errors were employed to correct for heteroskedasticity, autocorrelation, and cross-sectional dependence, thereby reinforcing the reliability and validity of the fixed effects model.

4. DISCUSSIONS

The results section's data show the estimated coefficients for models analyzing Brent Crude, WTI, Dubai Crude, and Media Price, revealing consistent relationships between oil prices and supply- and demand-side factors.

- **Supply-Side Influences:** Oil reserves are consistently positively correlated with oil prices. Increased reserves indicate potential future supply constraints, leading to higher prices due to market speculation and strategic stockpiling. This relationship holds for Brent, WTI, Dubai Crude, and Media Price variables, as confirmed by Driscoll-Kraay estimates. Active oil rigs also significantly impact prices, as there is a delayed increase in rig activity as prices rise, which can further drive prices up when market expectations remain positive. Additionally, increased international oil trade tends to lower prices by expanding global supply and easing upward pressure on prices.

- **Demand-Side Influences:** Industrial output significantly increases oil prices as higher industrial activity drives greater oil consumption in manufacturing, transportation, and energy production. The consistent positive effect across models highlights the role of industrial demand in shaping oil prices. In contrast, renewable energy consumption and exchange rate fluctuations significantly negatively impact oil prices. The global shift to renewables reduces oil demand, while a stronger U.S. dollar makes oil more expensive for foreign buyers, dampening demand. Exchange rate volatility further depresses prices by creating market uncertainty.

- **Technology and Global Shocks:** Technological advancements consistently negatively affect oil prices, as they enhance energy efficiency and promote alternatives to oil while lowering production costs and increasing supply. The robustness of this effect across models underscores the role of technology in reducing oil dependence. The COVID-19 pandemic caused a significant drop in oil prices due to global lockdowns and reduced demand in key sectors like transportation and manufacturing. In contrast, the 2008 Global Financial Crisis had a less consistent impact, particularly in the WTI model, where it was not statistically significant. The crisis's delayed effect on oil demand contrasts with the immediate shock caused by COVID-19, which disrupted entire industries. The WTI market's more U.S.-centric nature, supported by strategic reserves and local resilience, likely cushioned its response to the financial crisis.

5. CONCLUSIONS

This study delves into the complex relationship between supply and demand factors that affect global oil prices, focusing on the period from 2000 to 2022. The study utilizes an econometric panel methodology to examine the main influences on Brent Crude oil prices, WTI, and Dubai Crude prices and a composite index of the three to ensure the robustness of the findings. The findings consistently highlight the significant influence of supply and demand factors on oil price changes. On the supply side, the research shows that rising oil reserves consistently correlate with higher oil prices. Increasing reserves may indicate potential future supply constraints, leading to market expectations and upward price pressure. Similarly, the number of active oil rigs correlates positively with oil prices, indicating that delayed increases in rig activity often coincide with rising prices, further pushing them upward as market optimism persists. However, international oil trade expansion tends to lower prices by increasing global supply.

From the demand side, industrial output significantly drives oil prices, as heightened industrial activity increases oil consumption across manufacturing, transportation, and energy production sectors. Conversely, renewable energy consumption exerts downward pressure on oil prices, reflecting the global shift from fossil fuels. Exchange rate fluctuations also impact oil prices, with a stronger U.S. dollar dampening foreign demand, while exchange rate volatility contributes to market uncertainty, further depressing prices. Technological advancements consistently significantly reduce oil prices by promoting energy efficiency, lowering production costs, and increasing supply through innovations in oil extraction and alternative energy sources. The study also highlights the significant impact of the COVID-19 pandemic, which caused a significant drop in oil prices due to global lockdowns and reduced demand from major sectors. However, the Global Financial Crisis 2008 had a less consistent impact on oil prices, particularly in the WTI model, where it was not statistically significant.

The findings provide valuable insights for policymakers and stakeholders who want to understand the complexities of the global oil market and create strategies to improve economic stability and resilience.

The research shows that supply and demand are the main factors influencing global oil prices, a consistent observation across all models using Driscoll-Kraay standard errors. Additionally, the study emphasizes the significant role of international oil trade, which has been overlooked in many previous studies.

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