ISSN 2466-4693
UDC/UDK: 005:62

University "Union – Nikola Tesla"
School of Engineering Management

Univerzitet „Union – Nikola Tesla"
Fakultet za inženjerski menadžment



Serbian Journal of Engineering Management

Vol. 7, No. 2, 2022

Belgrade, July 2022

ISSN 2466-4693
UDC/UDK: 005:62

University “Union – Nikola Tesla“
School of Engineering Management

Univerzitet „Union – Nikola Tesla“
Fakultet za inženjerski menadžment

Serbian Journal of Engineering Management

Vol. 7, No. 2, 2022

Belgrade, July 2022
Beograd, jul 2022.

Serbian Journal of Engineering Management
Vol. 7, No. 2, 2022

Published semiannually (January and July)/Izlazi dva puta godišnje (januar i jul)

Publisher/Izdavač:
University "Union – Nikola Tesla", School for Engineering Management, Belgrade
Univerzitet „Union – Nikola Tesla", Fakultet za inženjerski menadžment, Beograd

For publisher/Za izdavača:
Prof. dr Vladimir Tomašević

Press/Štampa: Black and White, Belgrade

Circulation/Tiraž: 300

ISSN: 2466-4693

Contact/Kontakt:
Serbian Journal of Engineering Management
Editorial Board/Uredništvo
School of Engineering Management/Fakultet za inženjerski menadžment
Bulevar vojvode Mišića 43
11000 Beograd
casopis@fim.rs
Tel. +381 11 41 40 425

CONTENT/SADRŽAJ

A Message from the Editor-in-Chief

Serbian Journal of Engineering Management is a scientific journal, published by School of Engineering Management and Society of Engineering Management of Serbia. The Journal is cathegorized by the Ministry of science, technological development, and Innovation of the Republic of Serbia. From 2020, the Journal is indexed in EBSCO databases. This international Journal is dedicated to the wide scope of themes associated to engineering management and industrial engineering and is published semiannualy. The papers are presented in English.

Themes included in the journal are: Engineering management, Industrial engineering, Project management, Strategic management, Logistics, Operations management, Production systems management, Quality control, Quality management, Entrepreneurship, Risk management, Human resources management, Leadership, Organizational behaviour, Organizational culture, Financial management, Information systems, High technologies management, Environmental management, Waste management, Maintenance management, Creative industries management, Security management, and Marketing.

Editorial board is consisted of distinguished academics from various countries dedicated to establishing the highest academic standards and promoting engineering management principles in Serbia.

Information on the journal in English and Serbian can be found at the journal web page: https://fim.edu.rs/en/serbian-journal-of-engineering-management/.

Prof. Dr. Vladimir Tomašević, FRSA

Reč urednika

Serbian Journal of Engineering Management je naučno-stručni časopis, koji izdaje Fakultet za inženjerski menadžment i Društvo inženjerskog menadžmenta Srbije. Časopis je kategorisan od strane Ministarstva nauke, tehnološkog razvoja i inovacija. Časopis je takođe od 2020. indeksiran u EBSCO bazama. Ovaj međunarodni časopis je posvećen temama povezanim sa inženjerskim menadžmentom i industrijskim inženjerstvom i izlazi dva puta godišnje (u januaru i julu). Zastupljeni jezik za članke je engleski.

Teme zastupljene u časopisu su: inženjerski menadžment, industrijsko inženjerstvo, upravljanje projektima, strategijski menadžment, logistika, menadžment operacija, menadžment proizvodnih sistema, kontrola kvaliteta, upravljanje kvalitetom, preduzetništvo, upravljanje rizikom, upravljanje ljudskim resursima, liderstvo, organizaciono ponašanje, organizaciona kultura, finansijski menadžment, informacioni sistemi, menadžment u visokotehnološkim industrijama, menadžment životne sredine, upravljanje otpadom, menadžment održavanja, menadžment kreativnih industrija, bezbednosni menadžment i marketing.

Uredništvo časopisa čine istaknuti naučnici iz različitih zemalja sveta koji su posvećeni postavljanju visokog akademskog standarda i promocije principa inženjerskog menadžmenta u Srbiji.

Informacije o časopisu i poziv za autore, na srpskom i engleskom jeziku, nalaze se na web stranici časopisa: https://fim.edu.rs/istrazivanje-i-saradnja/naucno-strucni-casopis/.

Prof. dr Vladimir Tomašević, FRSA

Original Scientific Paper/Originalni naučni rad UDC/UDK: 658.567:669.18
Paper Submitted/Rad primljen: 4. 4. 2022.
Paper Accepted/Rad prihvaćen: 1. 7. 2022.
10.5937/SJEM2202001N

Upravljanje otpadom iz proizvodnje čelika u elektrolučnim pećima

Irena Nikolić[1]

[1]Faculty of Metallurgy and Technology, University of Montenegro, irena@ucg.ac.me

Apstrakt: Elektropećna troska (ELPT) i elektropećna prašina (ELPP) su otpadni materijali koji se generišu tokom proizvodnje čelika u elektrolučnim pećima koji podrazumeva pretapanje gvozdenog i čeličnog otpada u elektrolučnim pećima (ELP). U poslednje vreme posebna pažnja je posvećena valorizaciji ELPT i ELPP obzirom da njihovo odlaganje može imati negativan uticaj na životnu sredinu. U ovom radu je dat pregled metoda koje se koriste za procesiranje ELPT i ELPP, a adresirane su i njihove prednosti mane. Literaturni podaci ukazuju da se ELPT može uspešno valorizovati u građevinarstvu, za prečišćavanje otpadnih voda i u poljoprivredi kao nutritient dok je prisustvo metala u ELPP motivacioni faktor za recikliranje ELPP. Osim toga, valorizacija ELPP putem incorporacije u razne materijale procesom vitrifikacije i stabilizacije/solidifikacije je takođe diskutovana.

Ključne reči: elektropećna troska, elektropećna prašina, valorizacija, hidro-metalurški procesi, piro-metalurški procesi

Waste Management in Steelmaking by EAF Route

Abstract: Electric arc furnace slag (EAFS) and electric arc furnace dust (EAFD) are the waste materials from the steel production by EAF route which implies remelting of iron and steel scrap in electric arc furnaces (EAF). In recent years, special attention is paid on the valorisation of EAFS and EAFD since disposing the both may cause negative impacts on the environment. In this paper, the methods that are in use to process EAFS and EAFD have been reviewed, and their advantages and disadvantages are also addressed. Literature data indicates that EAFS can be successfully valorised in civil engineering, wastewaters treatments and as a soil nutrient in agriculture, while the presence of valuable elements in EAFD is motivational factors for the recycling of EAFD. Moreover, valorisation of EAFD through vitrification and stabilization/solidification processes is also widely discussed.

Keywords: electric arc furnace slag, electric arc furnace dust, valorisation, hydro-metallurgical processes, pyro-metallurgical processes

1. Introduction

Steel production in electric arc furnaces generates two waste materials: electric arc furnace slag (EAFS) and electric arc furnace dust (EAFD). EAFS is formed during the iron and steel scrap remelting in electric arc furnaces and floats on the surface of the molten metal, protecting it from oxidation. In addition, the impurities present in the steel scrap are removed by the formation of metal/non-metal oxides that transfer into the slag. EAFS is non-hazardous waste materials which is generated in an amount of about 150-180 kg of EAFS per tonne of steel produced (De Domenico et al., 2018), and comprise of oxides of calcium, iron, silicon, aluminium and manganese. Average chemical composition of EAFs is given in table 1. Minerological composition of slag comprised of iron oxides (wustite, magnesioferrite, magnetite, and hematite), silicates (larnite, bregedite/merwinite, and gehlenite), and manganese oxides (birnessite, hausmannite, rutile/hollandite, and groutellite) (Teo et al., 2020).

Table 1: Chemical composition of EAFS (Vaiana et al., 2019) and EAFD (Sofilić et al., 2004)

EAFS		**EAFD**	
Chemical composition	**Average range (wt %)**	**Chemical composition**	**Average range (wt %)**
SiO_2	5–40	Fe	10 – 45
FeO	1.2–50	Zn	2 – 46
CaO	15–54	Pb	0.40 – 15.14
MgO	1–21.4	Cr	0.2 – 11
Al_2O_3	1–15	Cd	0.01 – 0.30
Others	0.05–5	Mn	1 – 5
		Cu	>3
		Si	1 – 5
		Ca	1 – 25
		Mg	1 – 12
		Al	0.1 – 1.5
		C	0.11 – 2.36
		S	1.5 – 2.5
		Na	0.50 – 1.80
		K	0.48 – 1.26

Since the production of steel making slag in the Europe was 22.6 million of tonnes in 2018, around 35.1 % of which was produced by electric arc furnace route (Euroslag 2018) valorization of this waste material is of great importance from the stand point of environmental production. Different possibility of EAFS valorization has been proposed. This slag is mainly utilized in civil engineering as an constituent of asphalt mixture, for a road construction, concrete production, cement substituent, ″green″ cement and in agriculture as fertilizer and for waste water treatment. (Nikolić et al., 2014; Autelitano and Giuliani, 2016; Monosi et al., 2016; Rondi et al., 2016; Santamaría et al., 2017; Skaf et al., 2017)
On the other hand, EAFD is generated in a much lower amount in comparison to EAFS (20 kg of EAFD per tonne of steel produced) (Sofilić et al., 2004) and it characterized as a hazardous waste due to the content of heavy metals (table 1) and their potential leaching into environment. EAFD is mainly comprised of iron and zinc (in the form of oxides) but the presence of other heavy metals depending on the composition of scrap charged into electric arc furnace, (Sofilić et al., 2004).

The basic mineralogical composition of EAFD consists of oxides αFe_2O_3, Fe_3O_4, FeO, ZnO, SiO_2, $ZnO{\cdot}Fe_2O_3$, $ZnFe_2O_4$, $3CaO{\cdot}2SiO_2$, $4PbO{\cdot}PbSO_4$ (Sofilić et al., 2004). Utilisation of EAFD is the great challenge of today due to its toxicity. Since EAFD contains significant amounts of iron and non-ferrous metals, primarily zinc, the valorisation of this type of waste is mainly directed towards the extraction of these metals (Zn and Fe) which may proceed via pyro-metallurgical, hydro-metallurgical and combined process. Optionally, incorporation of EAFD into different materials is also considering. These processes imply the fixation of toxic component from EAFD through different vitrification or stabilization/solidification methods.

2. Valorisation of EAFS

Valorisation of EAFS in asphalt mixture refer to the introduction of EAFS in several kinds of mixtures such as stone mastic asphalt, warm mixes, high modulus mixes and porous mixes (Skaf et al., 2017). The use of EAFS in asphalt mixes mainly considered partial or total substitution of the coarse aggregate but usage of EAFS as replacement of fine aggregate (Ziari et al., 2015) or as filler after crushing were also considered (Krayushkina et al., 2012). Incorporation of EAFS into the asphalt mixture results in an improved mechanical behavior of mixtures with EAFS in comparison to the one with natural aggregate. Generally, asphalt mixture containing EAFS displayed better stability, indirect tensile strength, creep, cracking, fatigue and abrasion than the samples with natural aggregate but worsening of water sensitivity is observed (Skaf et al., 2017). However, leaching of vanadium and chromium from asphalt mixtures containing EAFS may be of concern (Skaf et al., 2017).

EAFS also can be used as an aggregate for a concrete production with properties (compressive strength and elastic module) comparable with the properties of conventional concrete (Pellegrino and Gaddo, 2009). However, use of EAFS as a replacement for a natural aggregate for a concrete production negatively affect the workability of fresh concrete, so it is recommended to use at least 50 % of fine natural aggregates, to prevent difficulties in mix preparations (Pellegrino and Faleschini, 2016).

Moreover, presence of free oxides (CaO and MgO) in EAFS is limiting factor in EAFS application in concrete production due to the volume instability of these oxides which hindering the concrete's durability. Thus, outdoor aging of EAFS and exposure to moisture are necessary methods before EAFS slag be used as an aggregate for concrete production (Teo et al., 2020)

A special attention in is paid regard the usage of EAFS as a source material for a synthesis of ″green″ cements or alkali activated binder produced by means of chemical reaction of EAFS with alkaline activator (solution of MOH or M_2SiO_3 were M is Na or K ion). These materials exhibited mechanical properties that enable their application in a civil engineering and currently they are considering as an alternative to cement binder with a special emphasis on a durability of these materials in aggressive environment like high temperature conditions and aggressive solutions (Nikolić et al., 2014).

EAFS usage for waste water treatment was also widely investigated. The successful removal of heavy metals from aquatic solution was reported (Ćurković et al., 2001; Nikolić et al., 2020; Tadić et al., 2021). Sorption properties of slag are related to the presence of silanol active groups on the surface of EAFS that attach heavy metals present in the aquatic media. Sorption properties of EAFS can be greatly improved by surface modification by alkali activation process (Nikolić et al,. 2020a) due to the increase of active silanol groups. Moreover, EAFS can also be used for phosphorous removal from waste waters and aquatic solutions (Drizo et al., 2006)

Due to its composition, EAFS can be used in agriculture to improve soil quality, since it contains elements which are beneficial for plants growth, such as: P, S, Mn, Fe and Mo. Soil acidity negatively affects soil fertility, as well as mineral content and composition. Slag finds its application in agriculture as a substitute for limestone and as such affects the increase in pH thereby reducing the acidity of the soil according Eq.1. (Rashid Khan and Akae, 2008).

$$CaO\ (s) + H_2O\ (aq) = Ca(OH)_2\ (s) \qquad (1)$$

Slag also contains silicon, which is one of the compounds of particular importance because the plant can successfully use it as a nutrient, and it also improves the quality of the soil. Moreover, slag addition to soil has a positive effect on the protection of plants from pathogens due to the availability of Si found in the slag, which accumulates in plant cells and makes them resistant to various diseases (Rex, 2002). Slag also contains a large proportion of iron which is also beneficial for plant growth (Wang and Cai, 2006).

3. Valorisation of EAFD

3.1. Processing of EAFD by pyro-metallurgical route

Generally, valorization of EAFD may proceed via pyro- and hydro-metallurgical process. Pyro-metallurgical processing of EAFD is mainly directed toward recovery of valuable metals such, Fr, Zn, Pb. etc., from the dust. This process is essentially based on carbothermic reduction were metal oxides in EAFD are reduced by either carbon or carbon monoxide into the metals forms at temperatures above 1000 °C (Lin et al., 2017) (De Buzin et al., 2017). Since, Zn, Pb and Cd are characterized by high vapour pressures; they evaporate at these temperatures and may be recovered by condensation while Fe and Cr remain in the residue which is considered as secondary raw material for steel production (Lin et al., 2017). Recovery of most abundant metals present in EAFD (Zn and Fe) precedes according Eqs. (2) to (11).

$$ZnO + CO = Zn_{(g)} + CO_{2(g)} \qquad (2)$$

$$ZnFe_2O_{4(s)} + CO_{(g)} = Zn_{(g)} + Fe_{(s)} + CO_{2(g)} \qquad (3)$$

$$ZnO_{(s)} + C_{(s)} = Zn_{(g)} + CO_{(g)} \qquad (4)$$

$$ZnFe_2O_{4(s)} + C_{(s)} = Zn_{(g)} + Fe_{(s)} + CO_{2(g)} \qquad (5)$$

$$3Fe_2O_3 + CO_{(g)} = 2Fe_3O_{4(s)} + CO_{2(g)} \qquad (6)$$

$$Fe_3O_{4(s)} + CO_{(g)} = 3FeO_{(s)} + CO_{2(g)} \qquad (7)$$

$$FeO_{(s)} + CO_{(g)} = Fe_{(s)} + CO_{2(g)} \qquad (8)$$

$$3Fe_2O_3 + C_{(s)} = 2Fe_3O_{4(s)} + CO_{(g)} \tag{9}$$

$$Fe_3O_{4(s)} + C_{(s)} = 3Fe_{(s)} + CO_{(g)} \tag{10}$$

$$FeO_{(s)} + C_{(s)} = Fe_{(s)} + CO_{(g)} \tag{11}$$

The common commercial pyro-metallurgical processes for EAFD processing are Waelz kiln and Rotary hearth furnace processes. Waelz kiln process recycles the majority of EAFD (about 83%) (Yakornov et al., 2017). During this process Zn and Pb recovers in the form of oxides (Waltz oxide), and iron oxides constitute a by-product called Waelz slag. Disadvantages of Waelz kiln process are: high energy consumption, this is off-site process and the process become economic only when its capacity is high (50,000 tonnes/year) and zinc concentration of the dust is higher than 16 wt.% and (Lin et al., 2017; Kiran Kumar and Roy, 2022). Moreover, despite its commercial success, the Waelz process generates a significant amount of waste - Waelz slag which needs proper environmental disposal so many countries today prevail to leave Waelz kiln process.

Rotary hearth furnace process is more effective than Waelz kiln process since Zn- poor EAFD (Zn content below 5 %) can be processed in this way. During this process pelletized/briquetted mixture of EAFD, reducing agents and additives is charged into the rotary hearth furnace were metallic oxides undergo reduction to the metallic forms. Zn and Pb evaporates during process and being collected by dust collector, and iron oxides reduces effectively (up to 90 %) into direct reduced iron instead of formation of Fe- rich slag as is case during Waelz kiln process. However, the low strength of pallets/briquettes that charges into the furnace lead to the decrease of effectivity of this process because the breakage of the pallets/briquettes causes the pelleting/briquetting step to be repeated (Suetens et al., 2014; Lin et al., 2017; Wang et al., 2021).

Further, PRIMUS process developed by Paul Wurth overcomes the disadvantages of Waelz kiln process and Rotary hearth furnace process. This process is featured by unprepared (non-agglomerated) finely dispersed EAFD with Zn content higher than 5 %, rapid reduction of metal oxides, high efficiency and excellent quality products: including highly metallized (directly reduced) iron (> 90%) and highly concentrated zinc oxide which enable selective extraction of the zinc (Wang et al., 2021; Kiran Kumar and Roy, 2022). This process consists of multiple hearth furnace for processing where raw materials undergo a sequence of steps: drying (150 °C), calcining (450 °C) and heating (1050 °C) yielding formation of two products: iron rich concentrate and oxides of Zn and Pb (Kiran Kumar and Roy, 2022). High recovery of zinc in the form of ZnO (95%), and highly metallized (directly reduced) iron (with iron content of 95%) are characteristic of this process (Kiran Kumar and Roy, 2022). Advantage of this process is also low-operating temperature.

Besides these pyro-metallurgical processes several unconventional methods for metal recovery from EAFD are also discussed, e.g. OXYCUP process, coke packed bed process, Ausmelt process, electric smelting reduction furnace process, Plasma dust process, plasma-arc process, Elkem multi-purpose furnace process, submerged plasma process, pig iron zinc oxide process, flame reactor process, thermal plasma reduction process, microwave processing, solar thermal reduction process, iron bath smelting process, calcification process and halogenation process (Lin et al., 2017)

3.2. Processing of EAFD by hydro-metallurgical route

In comparison to pyro-metallurgical process, hydro-metallurgical processes are more effective due to low energy consumption. They imply transfer of Zn from solid to liquid phase which is followed by electrochemical treatment of solution to obtain metallic Zn. Hydro-metallurgical processes generally proceed through alkaline or acid leaching of EAFD. Mineralogical composition of EAFD i.e. zincate/franklinite ratio ($ZnO/ZnFe_2O_4$) is crucial factor for success of hydrometallurgical processes since ZnO is easy to dissolve, whereas $ZnFe_2O_4$ is not. Moreover, EAFD contains chloride that need to be removed before leaching processes. The main disadvantage of acid leaching of EAFD is simultaneous dissolution of Fe along with Zn which makes alkaline leaching process more favorable since iron remains largely insoluble.

Their main objective of EAFD leaching process is to produce an aqueous zinc ion according Eq. (12) in the case of acid media or according Eq. (13) in alkaline media (De Buzin et al. 2017)

$$ZnO = Zn^{2+} + 2e^{2-} \quad (12)$$

$$ZnO + OH^{-} = (ZnO_2)^{2-} + H_2O \quad (13)$$

EAFD leaching with sulphuric acid (H_2SO_4) is most popular and cheap method for EAFD treatment. It enables rapid dissolution of ZnO while $ZnFe_2O_4$ dissolution is much slower and depends on temperature. Leaching of EAFD on higher temperatures favour dissolution of Zn from $ZnFe_2O_4$ but it brings a significant dissolution of Fe. Co-dissolution of Fe can be avoided by using moderate concentrations so that the final pH is 4–5 and the dissolved Fe will precipitate as $Fe(OH)_3$ (Binnemans et al., 2020). Recovery of Zn by sulphuric acid leaching proceeds according Eqs. (14) to (16) (Havlik et al., 2004).

$$ZnO + H_2SO_4 = ZnSO_{4(aq)} + H_2O \quad (14)$$

$$ZnFe_2O_4 + H_2SO_4 = ZnSO_{4(aq)} + Fe_2(SO_4)_3 + H_2O \quad (15)$$

$$ZnFe_2O_4 + H_2SO_4 = ZnSO_{4(aq)} + Fe_2O_3 + H_2O \quad (16)$$

Alkaline leaching with NaOH is more favorable than acid leaching due to the high selectivity of Zn and Fe leaching. In alkaline medium ZnO is easy to dissolve (Eq.17) while iron oxides remain insoluble. However, Zn present in the form of $ZnFe_2O_4$ also remained insoluble. Caustic roasting of EAFD with NaOH at temperatures of 350-450 °C transfers insoluble $ZnFe_2O_4$ in soluble sodium zincate (Na_2ZnO_2) and insoluble hematite (Fe_2O_3) and then EAFD can be leached with a dilute NaOH solution, with zinc recoveries of 95% (Havlik et al., 2004).

$$ZnO + 2NaOH + H_2O = Na_2Zn(OH)_{4(aq)} \quad (17)$$

3.3. Incorporation of EAFD into different materials

Other alternative routes of EAFD management involve fixation of toxic EAFD into different materials by vitrification and stabilization/solidification processes. These processes basically involve immobilization of heavy metals present in EAFD into different materials by means that making reducing their mobility into environment. Vitification proceeds through mixing of EAFD with the cheap agent such as SiO_2, Na_2O (or Na_2CO_3), CaO accompanied with melting process leading to the incorporation of toxic heavy metals into the ceramic glass network (Pelino et al. 2002; Tsilika and Komninou, 2007; Nazari et al., 2018). Limiting factor in commercial application of vitrification process is high energy consumption.

Stabilization/solidification processes were initially developed as a treatment concept for hazardous waste prior to landfilling. Cement is often used as an agent for immobilization of heavy metals through stabilization/solidification process resulting in a monolithic, water tight final product with suitable mechanical properties which are necessary for it transportation and reducing the risk of fracture (Salihoglu et al., 2007; Ledesma et al., 2018). Moreover, the use of fly ash and granulated blast furnace slag as an additive to cement mixture for stabilization/solidification processes was also reported (Pereira et al., 2001; Laforest and Duchesne, 2007; Salihoglu and Pinarli, 2008). Recently, stabilization/solidification of EAFD through an innovative technology (alkali activation of steel making slag), is considered as a successful technology for a fixation of heavy metals from EAFD into the calcium alumina silica hydrated gel, reaction product of slag alkali activation (Nikolić et al., 2020b).

4. Conclusion

Steel production in electric arc furnaces generates the waste materials EAFS and EAFD. Non-hazardous EAFS is mainly valorised in civil engineering, waste water treatment and in agriculture. On the other hand, EAFS is toxic waste material and need to be treated before being disposed on landfills. Valorisation of EAFD is directed towards Zn recovery by pyro-and hydro-metallurgical processes, but fixation of this dust into different materials through vitrification and stabilization/solidification processes is also considered.

Literature

1. Autelitano, F., Giuliani F . (2016) Electric arc furnace slags in cement-treated materials for road construction: Mechanical and durability properties. *Construction and Building Materials*, 113:280–289. https://doi.org/10.1016/j.conbuildmat.2016.03.054
2. Binnemans, K., Jones, P. T., Manjón Fernández, Á., Masaguer Torres, V. (2020) Hydrometallurgical Processes for the Recovery of Metals from Steel Industry By-Products: A Critical Review. *Journal of Sustainable Metallurgy*, 6:505–540. https://doi.org/10.1007/s40831-020-00306-2
3. Ćurković L., Cerjan-Stefanović Š., Rastovèan-Mioè, A. (2001) Batch Pb2+ and Cu2+ removal by electric furnace slag. Water Res 35:3436–3440. https://doi.org/10.1016/S0043-1354(01)00037-9
4. De Buzin, P. J. W. K., Heck, N. C., Vilela, A. C. F. (2017) EAF dust: An overview on the influences of physical, chemical and mineral features in its recycling and waste incorporation routes. *Journal of Materials Research and Technology*, 6:194–202. https://doi.org/10.1016/j.jmrt.2016.10.002
5. De Domenico, D., Faleschini, F., Pellegrino, C., Ricciardi, G. (2018) Structural behavior of RC beams containing EAF slag as recycled aggregate: Numerical versus experimental results. *Construction and Building Materials*, 171:321–337. https://doi.org/10.1016/j.conbuildmat.2018.03.128
6. Drizo, A., Forget, C., Chapuis, R. P., Comeau, Y. (2006) Phosphorus removal by electric arc furnace steel slag and serpentinite. *Water Research*, 40:1547–1554. https://doi.org/10.1016/j.watres.2006.02.001
7. Euroslag (2018) Euroslag, 2018. https://www.euroslag.com/products/statistics/statistics-2018. Accessed 28 Aug 2022
8. Havlik, T., Friedrich, B., Stopić, S. (2004) Pressure leaching of EAF dust with sulphuric acid. *World Metall - ERZMETALL* 57:83–90
9. Kiran Kumar, T., Roy, G.G. (2022) A Review on Processing of Electric Arc Furnace Dust (EAFD) by Pyro-Metallurgical Processes. *Transactions of the Indian Institute of Metals*, 75:1101–1112. https://doi.org/10.1007/s12666-021-02465-6
10. Krayushkina, K., Prentkovskis, O., Bieliatynskyi, A., Junevičius R. (2012) Use of steel slags in automobile road construction. *Transport*, 27:129–137. https://doi.org/10.3846/16484142.2012.690093
11. Laforest, G., Duchesne, J. (2007) Investigation of stabilization/solidification for treatment of electric arc furnace dust: Dynamic leaching of monolithic specimens. *Cement and Concrete Research*, 37:1639–1646. https://doi.org/10.1016/j.cemconres.2007.08.025
12. Ledesma, E. F., Lozano-Lunar, A., Ayuso, J., Galvín, A. P., Fernández, J.M., Jiménez, J. R. (2018) The role of pH on leaching of heavy metals and chlorides from electric arc furnace dust in cement-based mortars. *Construction and Building Materials* 183:365–375. htps://doi.org/10.1016/j.conbuildmat.2018.06.175
13. Lin, X., Pengm, Z., Yan, J., Li, Z., Jiann-Yang Hwang, J. Y., Zhang, Y., Li, G., Jiang, T. (2017) Pyrometallurgical recycling of electric arc furnace dust. *Journal of Cleaner Production*, 149:1079–1100. https://doi.org/10.1016/j.jclepro.2017.02.128
14. Monosi, S., Ruello, M. L., Sani, D. (2016) Electric arc furnace slag as natural aggregate replacement in concrete production. *Cement and Concrete Composition*, 66:66–72. https://doi.org/10.1016/j.cemconcomp.2015.10.004
15. Nikolić, I., Đurović, D., Tadić, M., Radmilović, V.V., Radmilović, R.V., (2020a) Adsorption kinetics, equilibrium, and thermodynamics of Cu^{2+} on pristine and alkali activated steel slag. *Chemical Engineering Communications*, 207:1278–1297. https://doi.org/10.1080/00986445.2019.1685986
16. Nikolić, I., Djurović, D., Marković, S.,Veselinović, Lj., Častvan, I.. J., Radmilović, V. V., Radmilović, R.V. (2020b) Alkali activated slag cement doped with Zn-rich electric arc furnace dust. *Jornal of Materials Reseach and Technology*, 9:12783–12794. https://doi.org/10.1016/j.jmrt.2020.09.024
17. Nikolić, I., Karanović, LJ., Častvan, I.J., Radmilović, R. V., Mentus, S., Radmilović, V.V. (2014) Improved compressive strength of alkali activated slag upon heating. *Materials Letters*, 133:251–254. https://doi.org/10.1016/j.matlet.2014.07.021
18. Pellegrino, C., Faleschini, F. (2016) Electric arc furnace slag concrete. In: Green Energy and Technology. pp 77–106.
19. Pellegrino, C., Gaddo, V. (2009) Mechanical and durability characteristics of concrete containing EAF slag as aggregate. *Cement and Concrete Composites*, 31:663–671. https://doi.org/10.1016/j.cemconcomp.2009.05.006
20. Pereira, C. F., Rodríguez-Piero, M., Vale, J. (2001) Solidification/stabilization of electric arc furnace dust using coal fly ash: Analysis of the stabilization process. *Journal of Hazardous Materials*, 82:183–195. https://doi.org/10.1016/S0304-3894(00)00359-9

21. Rashid Khan, M., Akae, T. (2008) Neutralizing capacity of basic slag in acid sulfate soils and its impacts on the solubility of basic cations under various moisture regimes. *Journal of the Faculty of Environmental Science and Technology. Okayama University*, 13:67–74

22. Rex, M. (2002) *Environmental aspects of the use of iron and steel slags as agricultural lime*. Proceeding of The Third European Slag Conference. Nottingham, UK,

23. Rondi, L., Bregoli, G., Sorlini, Collivignarelli, C., Plizzari, G. (2016) Concrete with EAF steel slag as aggregate: A comprehensive technical and environmental characterisation. *Composites Part B: Engineering*, 90:195–202. https://doi.org/10.1016/j.compositesb.2015.12.022

24. Salihoglu, G., Pinarli, V., Salihoglu, N. K., Karaca, G. (2007) Properties of steel foundry electric arc furnace dust solidified/stabilized with Portland cement. *Jornal of environmental management,* 85:190–197. https://doi.org/10.1016/j.jenvman.2006.09.004

25. Salihoglu, G., Pinarli, V. (2008) Steel foundry electric arc furnace dust management: Stabilization by using lime and Portland cement. *Jornal of Hazardous Materials*, 153:1110–1116. https://doi.org/10.1016/j.jhazmat.2007.09.066

26. Santamaría, A., Orbe, A., Losañez, M. M., Ortega-Lopez, V., González, J. J. (2017) Self-compacting concrete incorporating electric arc-furnace steelmaking slag as aggregate. *Materials & Design*, 115:179–193. https://doi.org/10.1016/j.matdes.2016.11.048

27. Skaf, M., Manso, J. M., Aragón, Á., Fuente-Alonso. J.A., Ortega-López, V. (2017) EAF slag in asphalt mixes: A brief review of its possible re-use. *Resource Conservatio and Recycling*, 120:176–185

28. Sofilić, T., Rastovčan-Mioč, A., Cerjan-Stefanović, Š., Novosel-Radović, V., Jenko, M. (2004) Characterization of steel mill electric-arc furnace dust. *Journal of Hazardous Materials*, 109:59–70. https://doi.org/10.1016/j.jhazmat.2004.02.032

29. Suetens, T,.Klaasen, B., Van Acker, K., Blanpain, B. (2014) Comparison of electric arc furnace dust treatment technologies using exergy efficiency. *Journal of Cleanar Production*, 65:152–167. https://doi.org/10.1016/j.jclepro.2013.09.053

30. Tadić, M., Bigović, M., Djurović D., Jakić, M., Nikolić, I. (2021) Simultaneous removal of Cu^{2+}, Zn^{2+} and Cd^{2+} from aqueous solutions by alkali activated slag. *Periodica Polytechnica Chemical Engineering*, 65:389–399. https://doi.org/10.3311/PPch.17619

31. Teo, P. T., Zakaria, S. K., Salleh, S. Z., Taib, M. A. A., Sharif, N. M., Seman, A. A., Mohamed, J. J., Yusoff, M., Yusoff, A. H., Mohamad, M., Masri, M. N., Mamat, S. (2020) Assessment of electric arc furnace (EAF) steel slag waste's recycling options into value added green products: A review. *Metal*s (Basel). 10:1–21. https://doi.org/10.3390/met10101347

32. Vaiana, R., Balzano, F., Iuele, T., Gallelli, V. (2019) Microtexture performance of EAF slags used as aggregate in asphalt mixes: A comparative study with surface properties of natural stones. *Applied Science*, 9:. https://doi.org/10.3390/app9153197

33. Wang, J., Zhang, Y., Cui, K., Fu, T., Gao. J., Hussain, S., AlGarni, T.S. (2021) Pyrometallurgical recovery of zinc and valuable metals from electric arc furnace dust – A review. *Journal of Cleanar Production,* 298:126788

Review Scientific Paper/Pregledni naučni rad UDC/UDK: 005.342:001.895
Paper Submitted/Rad primljen: 3. 5. 2022.
Paper Accepted/Rad prihvaćen: 1. 7. 2022.
10.5937/SJEM2202008R

Uticaj preduzetničkog ekosistema na iniciranje i razvoj inovacionih procesa

Jelena Raut[1]*, Slavica Mitrović Veljković[2], Boban Melović[3], Predrag Vidicki[4]

[1]University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia, jelenaraut@uns.ac.rs
[2]University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia, mslavica@uns.ac.rs
[3]University of Montenegro, Faculty of Economics, Podgorica, Montenegro, bobanm@ucg.ac.me
[4]University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Serbia, vidicki@uns.ac.rs

Apstrakt: Preduzetnički ekosistem postaje fenomen koji sve više postaje predmet istraživanja istraživača kojima je oblast interesovanja upravo preduzetništvo. Ono na šta istraživači iz oblasti nailaze jeste određeni jaz u literaturi koji postoji, a nastao je kao rezultat tumačenja preduzetničkog ekosistema sa različitih aspekata. Dok određeni istraživači preduzetnički ekosistem posmatraju kao kontekst preduzetništva, kao regionalni inovativni sistem ili kao preduzetničko okruženje, sa druge strane autori ga posmatraju kao proces preduzetništva koji prati visoki rast ili kao poslovni ekosistem. Ovaj rad ima za cilj da pokaže uticaj koji preduzetnički ekosistem ima na iniciranje i razvoj inovacija, a samim tim i na preduzetnički proces, kao jedan od najvažnijih uticaja na rast i razvoj ekonomije svake zemlje.

Keywords: preduzetnički ekosistem, preduzetništvo, kontekst, inovacija

The Influence of the Entrepreneurial Ecosystem on the Initiation and Development of Innovation Processes

Abstract: The entrepreneurial ecosystem is becoming a phenomenon that is increasingly becoming the subject of research by researchers whose field of interest is precisely entrepreneurship. What researchers in the field are encountering is a certain gap in the literature that exists, which arose as a result of interpreting the entrepreneurial ecosystem from different aspects. While certain researchers view the entrepreneurial ecosystem as a context of entrepreneurship, as a regional innovation system or as an entrepreneurial environment, on the other hand the authors view it as an entrepreneurial process that follows high growth or as a business ecosystem. This paper aims to show the impact that the entrepreneurial ecosystem has on the initiation and development of innovations, and therefore on the entrepreneurial process, as one of the most important influences on the growth and development of the economy of each country.

Keywords: entrepreneurial ecosystem, entrepreneurship, context, innovation

1. Introduction

During the last decade of the XXI century, the concept of entrepreneurial ecosystems is gaining great popularity in the field of entrepreneurship. As Wurth et al. point out, as the main directions of research, i.e., ways of interpreting entrepreneurial ecosystems, the entrepreneurial context (Autio et al., 2014; Welter, 2011), entrepreneurship that follows high growth (Autio and Rannikko, 2016; Henrikson and Johansson, 2008), regional innovation systems (Cooke, 2007; Sternberg, 2007; Ylinenpaa, 2009), entrepreneurial environment (Gnyawali and Fogel, 1994; Van De Ven, 1993) and business ecosystem (Adner, 2017; Moore, 1993) are significant (Wurth et al., 2022). The context of entrepreneurial ecosystems opens up new research questions related to how to support economic prosperity and growth, which represent fundamental social science questions. As there is research interest in entrepreneurial ecosystems, there is still a need to see what insights the various case studies and analyzes have come to. This paper aims to review the literature according to Autio (2014), Van de Ven (1993) and Adner (2017) and determine how researchers from the context of entrepreneurship, entrepreneurial environment and business ecosystem observe the entrepreneurial ecosystem and whether the entrepreneurial ecosystem , that is, the context in which the entrepreneurial process takes place, affects the initiation and development of innovations, and therefore the entrepreneurial process.

2. The influence of the entrepreneurial environment on the development of innovations

As he proved in numerous studies, Schumpeter is the originator of the concept in which he claims that the processes of entrepreneurship and innovation are inextricably linked (Schumpeter, 2003). Subsequently, Baumol (2002) presents a concept in which entrepreneurial innovation is the basis of national competitive advantage. In accordance with the connection between the concept of entrepreneurship and the concept of innovation, many states, regions and universities have begun to introduce policies that will stimulate the development of innovation, in the hope of facilitating economic growth and development. Examples of such policies include local, regional and national entrepreneurial contexts aimed at, among other things, the promotion of start-ups in universities (Grimaldi et al., 2011).

What is very important for the entrepreneurial process is that not every entrepreneurial process follows innovation. Not all entrepreneurs innovate. Research conducted by GEM (Global Entrepreneurship Monitor) reports primary data from around 80 countries and shows that on average only less than 30% of all new ventures report that their products/services were new to customers/consumers and most of their competitors (Autio et al., 2014; Reynolds et al., 2005; Bosma et al., 2009). What is remarkable about the data provided by the GEM is that the share of new ventures that are innovative and high technology-based varied significantly between countries and within nations. This begs the question - do entrepreneurs innovate always and everywhere or does it depend on the influence of the context? Entrepreneurial innovation can also vary by region within a country. For example, San Francisco versus Alabama or Beijing versus rural China. Both region and industry are important contexts to consider, which will be discussed further below.

Ignoring contextual influences creates a large gap because policy action tends to influence entrepreneurial activity by manipulating the contexts in which individuals choose to act or not (Audretsch et al., 2007). In Figure 1 in the following chapter (Adner, 2014), the interrelationships between context, entrepreneurial and entrepreneurial behavior, type of entrepreneurial innovation and performance are presented. The aim, through a brief literature review, is to show that the context is extremely important for the initiation and development of innovation, and therefore the entrepreneurial process.

3. Elements of the entrepreneurial environment

Among the first studies whose focus was on entrepreneurial ecosystems, the study by the author Van de Ven (1993) stands out. When analyzing the research of Van de Ven (1993) and the way the researcher observes the entrepreneurial environment, it can be seen that the focus of the research is on the events involved in the construction of the industrial infrastructure that facilitates or constrains the entrepreneurial context. That infrastructure includes:

- institutional arrangements for legitimization, regulation and standardization of new technology:
    - identification,
    - management (norms, rules, regulations),
    - technological standards;
- public resources with basic scientific knowledge, funding mechanisms and pool of competent workforce:
    - scientific and technological research,
    - financing and insurance arrangements,
    - fund of human competences;
- proprietary research and development, manufacturing, marketing and distribution by private entrepreneurial companies to commercialize the innovation for profit:
    - research and development, testing, production,
    - the activity of the innovative channel,
    - market creation and consumer demand (Van de Ven, 1993).

Certainly, the research of Van de Ven (1993) is older than the research conducted by Autio (2014), but it can be seen to what extent Autio looks more broadly at the context (which will be discussed below), i.e., the entrepreneurial environment and the influences that can arising from the same, as significant for the initiation of innovations and the initiation of the entrepreneurial process.

Van de Ven (1993), observing the entrepreneurial environment, is among the first researchers who pointed out that it is not enough to focus only on the characteristics and behaviors of individual entrepreneurs, it is necessary to treat social, economic and political infrastructures as well.

What can certainly be observed, even though the terms are terminologically different, Van de Ven highlights the importance of the institutional context, as does Autio, who later began to observe the context in a wider environment.

The next researcher, namely Adner (2017), primarily contributed by providing a structuralist approach to the conceptualization of the entrepreneurial ecosystem construct, which is one of the main reasons why the authors of the paper decided to include him in this brief review of the literature on entrepreneurial ecosystems. Adner (2017) defines an ecosystem as "a structure of alignment of a multilateral set of partners that need to interact in order to materialize a proven value proposition." What can be concluded both from the aforementioned definition and from this line of research is that the emphasis is placed on the interested parties of the entrepreneurial ecosystem and in this sense it is justified why this line of research of entrepreneurial ecosystems belongs to the line of business ecosystems. If this direction of research is observed in the context in which the authors of the paper decided to observe the entrepreneurial ecosystem, the conclusion is drawn that Adner does not observe the environment in which the entrepreneurial process takes place, but observes the actors who influence the entrepreneurial process. Adner observes four elements underlying his structuralist approach to entrepreneurial ecosystems:

- activities that specify the discrete actions that need to be taken in order to realize the value proposition that needs to be materialized,
- actors, which are entities that undertake activities,,
- positions, which determine where the actors are in the course of activities through the system and characterize who is teaching whom and
- connections, which determine transfers between actors (Adner, 2017).

Adner gave an articulated approach to the entrepreneurial ecosystem, where he viewed it as a structure that should be at the service of further progress with the entrepreneurial construct.

Finally, the last researcher chosen by the authors, Autio (2014), views entrepreneurial ecosystems as the context of entrepreneurship. Autio aims to improve understanding of the theoretical and managerial implications for the policy of entrepreneurial innovation. It achieves its goal by examining the role of the context that fosters theoretical and managerial implications, after which it analyzes its impact on the outcome of entrepreneurial innovation.

As Autio (2014) claims, relying on GEM (Global Entrepreneurship Monitor) data, quality in entrepreneurship is of great importance. The data provided by GEM suggest that, if the rate of self-employment is viewed as a parameter of the success of the economy, countries with a developed entrepreneurial economy would be poor developing countries. In those economies that generate high income and have a good supply of high-quality jobs, self-employment rates are lower, while the aggregate contribution of entrepreneurs to innovation in that case tends to be higher. This is a contrast that draws attention to how context can influence the regulation of the entrepreneurial innovation process. Also, entrepreneurial innovations can vary depending on the region within the country where they take place, as well as between industries. That is, both region and industry are important contexts that determine the direction in which innovation will develop (Adner, 2014). Ignoring the context in which the entrepreneurial process takes place leads to the creation of a large gap because policy action seeks to influence entrepreneurial activity by manipulating the contexts in which individuals make decisions about whether or not to act (Zahra and Wright, 2011). Figure 1, which will be shown below, was created as a result of a contribution whose goal was to show the organizational framework, i.e., the interrelationships between the context, entrepreneurs and entrepreneurial behavior, types of entrepreneurial innovation and performance (Adner, 2014).

As can be seen in Figure 1, in the very center are entrepreneurs, that is, entrepreneurial behavior. The entrepreneurial process, depending on the level of analysis chosen by the researchers, can take place in a global, national, regional and local context. Entrepreneurial behavior is influenced by several factors, which are part of the context in which the entrepreneurial process takes place, among which the organizational context, institutional context, social context and technological context are distinguished. Whether the entrepreneurial process is analyzed at the global, national, regional or local level, each level is made up of organizational, institutional, technological and social contexts.

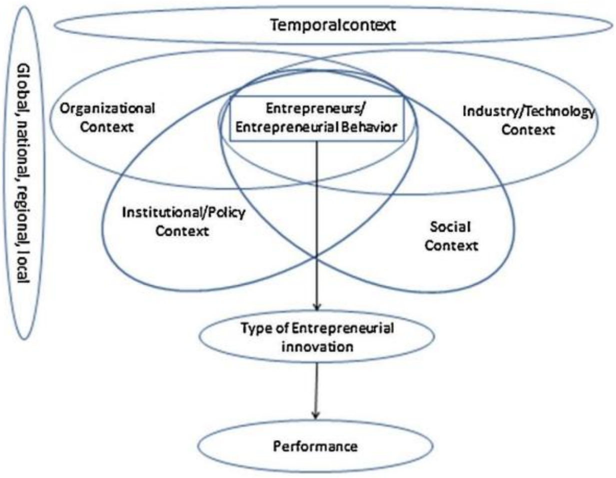


Figure 1. Elements of an entrepreneurial ecosystem (Adner, 2014)

Inevitably, the entrepreneurial process is also influenced by the time context. As a result of the influence of the aforementioned factors, the result is a certain type of entrepreneurial innovation, the end result of which is performance. When it comes to the industrial or technological context (above viewed as one of the factors of the environment or context), it is the context that has been studied the most within the framework of entrepreneurial innovations. For example, looking at the industry life cycle, it is usually argued that entrepreneurial activity is most likely to occur in the early stages of the life cycle, where the emphasis is on innovation to be reflected in product features and alternative product designs (Kenney and Von Burg, 1999). When it comes to organizational context, the organizational context includes organizational cultures, practices, experiences, knowledge, as well as the effects of skills (Nanda and Sorensen, 2010). Looking at the institutional, that is, the political context, it is the context that attracts a lot of attention from researchers in the literature on entrepreneurship (Autio et al., 2013b; Uhlaner and Thurik, 2007; Welter, 2011). Within the institutional context, it is very important to see the difference between formal and informal institutions. Formal institutions mainly influence economic outcomes, while informal institutions work through established social norms (Autio et al., 2014). The social context is the context that shows the extent to which the networks between entrepreneurs, trade partners, financiers and how existing companies influence the nature of entrepreneurship (Hoand and Antončić, 2003). Disseminated knowledge between agents and interactions and exchanges between them are key to the production of new knowledge, which will result in the creation of entrepreneurial innovation.

Autio focused on contextual influences, viewing them as an entrepreneurial environment, as well as how contextual influences influence the development of innovation. From this, it can be concluded that there are different types of contexts that influence entrepreneurial innovation, and what is certainly suggested as a proposal for future research is to fill the gaps in contextual interactions, as well as in entrepreneurial behavior. Public policies have long recognized that the entrepreneurial context profoundly influences entrepreneurial innovation.

4. Conclusion

This brief literature review by Van de Ven (1993), Autio (2014) and Adner (2017) aims to indicate that research on entrepreneurship is incomplete if it focuses exclusively on the personality of the entrepreneur and his characteristics. Certainly, for the initiation and development of an innovation, and later the entrepreneurial process, the characteristics of an individual who must see an opportunity on the market, accept the risk and commercialize their innovation are key, however, the environment in which that process takes place plays a major role in the realization of the aforementioned process.

One of the suggestions for future research is to investigate how different actors of the entrepreneurial ecosystem and the functions of the entrepreneurial ecosystem interact with each other in the entrepreneurial ecosystem, how they create an infrastructure that fundamentally limits or facilitates the development of the entrepreneurial process.

On the other hand, it is very important to answer the question of how different localized contexts influence the development of the entrepreneurial process because it is undeniable that their influence exists. This is significant due to the political influence that seeks to use the framework of the entrepreneurial ecosystem, that is, the entrepreneurial context, for the purpose of economic growth and development.

The study by Wurth (2022) sought to illuminate the breadth of empirical research on entrepreneurial ecosystems, however, it still lacks a consistent theoretical foundation.

Progress in research certainly exists, which emphasizes the importance of the context in which the entrepreneurial process takes place and which influences the initiation and development of innovation, which is of essential importance for it, however, research is needed that will be focused on the mutual relationship between the mechanisms and elements that form the entrepreneurial context.

Literature

1. Adner, R. (2017). Ecosystem as structure: An actionable construct for strategy. *Journal of Management, 43*(1), 39-58. https://doi.org/10.1177/0149206316678451
2. Audretsch, D., Grilo, I., Thurik, R. (2007). Handbook of Research on Entrepreneurship Policy. *Edward Elgar Publishing*.
3. Autio, E., Kenney, M., Mustar, P., Siegel, D., Wright, M. (2014). Entrepreneurial innovation: The importance of context. *Research Policy, 43*(7), 1097-1108. doi:10.1016/j.respol.2014.01.015
4. Autio, E., Pathak, S., Wennberg, K. (2013b). Consequences of cultural practices for entrepreneurial behaviors. *Journal of International Business Studies 44*(4), 334-362.
5. Autio, E., Rannikko, H. (2016). Retaining winners: Can policy boost high-growth entrepreneurship?. *Research Policy, 45*(1), 42-55. doi:10.1016/j.respol.2015.06.002
6. Baumol, W.J. (2014). The free-market innovation machine. *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*. Princeton: Princeton University press. https://doi.org/10.1515/9781400851638
7. Bosma, N., Acs, Z., Autio, E., Coduras, A., Levie, J. (2009). Global Entrepreneurship Monitor 2008 Executive Report: 65. GERA, London.
8. Cooke, P. (2007). Regional innovation, entrepreneurship and talent systems. *International Journal of Entrepreneurship and Innovation Management, 7*(2-5), 117-139. https://doi. org/10.1504/IJEIM.2007.012878
9. Gnyawali, D.R., Fogel, D.S. (1994). Environments for entrepreneurship development: Key dimensions and research implications. *Entrepreneurship Theory and Practice, 18*(4), 43-62, doi:10.1177/104225879401800403.
10. Grimaldi, R., Kenney, M., Siegel, D., Wright, M. (2011). 30 years after Bayh-Dole: reassessing academic entrepreneurship. *Research Policy 40*(8), 1045-1057. https://doi.org/10.1016/j.respol.2011.04.005
11. Henrekson, M., Johansson, D. (2008). Competencies and institutions fostering high-growth firm. *Foundations and Trends in Entrepreneurship, 5*(1), 1-80. https://doi. org/10.1561/ 0300000026
12. Kenney, M., Patton, D. (1999). Technology, entrepreneurship and path dependence: industrial clustering in Silicon Valley and Route 128. *Industrial and Corporate Change 8*(1), 67-103. https://doi.org/10.1093/icc/8.1.67
13. Moore, J.F. (1993). Predators and prey: A new ecology of competition. *Harvard Business Review, 71*(3), 75.
14. Nanda, R., Sorensen, J. (2010). Workplace peers and entrepreneurship. *Management Science, 56*(7), 1116-1126. https://doi.org/10.1287/mnsc.1100.1179
15. Reynolds, P., Bosma, N., Autio, E. (2005). Global entrepreneurship monitor: data collection desing and implementation 1998-2003. *Small Business Economics 24*(3), 205-231. https://doi.org/10.1007/s11187-005-1980-1
16. Schumpeter, J., Ursula, B. (2003). The theory of economic development. In *Joseph Alois*

Schumpeter, *Springer*, 61-116. ISBN: 978-1-4020-7463-9

17. Sternberg, R. (2007). Entrepreneurship, proximity and regional innovation systems. *Tijdschrift voor Economische en Sociale Geografie, 98*(5), 652-666. https://doi. org/ 10.1111/j.1467-9663.2007.00431.x
18. Van De Ven, H. (1993). The development of an infrastructure for entrepreneurship. *Journal of Business Venturing, 8*(3), 211-230, doi:10.1016/0883-9026(93)90028-4
19. Uhlaner, L., Thurik, R. (2007). Postmaterialism influencing total entrepreneurial activity across nations. *Journal of Evolutionary Economics 17*(2), 161-185. https://doi.org/10.1007/s00191-006-0046-0
20. Welter, F. (2011). Contextualizing entrepreneurship-conceptual challenges and ways forward. *Entrepreneurship Theory and Practice*, *35*(1), 165-184. doi:10.1111/j.1540-6520.2010.00427.x
21. Wurth, B., Stam, E., Spigel, B. (2022). Toward an Entrepreneurial Ecosystem Research Program. *Entrepreneurship Theory and Practice, 46*(3), 729-778. https://doi.org/10.1177/1042258721998948
22. Ylinenpaa, H. (2009). Entrepreneurship and innovation systems: Towards a development of the advancement of entrepreneurship research. *International Small Business Journal: Researching Entrepreneurship 32*(5), 479-500. https://doi.org/ 10.1177/0266242613519807
23. Zahra, A.S., Wright, M. (2012). Entrepreneurship's Next Act. *Academy of Management Perspectives 25*(4), 67-83. https://doi.org/10.5465/amp.2010.0149

Original scientific Paper/Originalni naučni rad UDC/UDK: 005.322:316.46
Paper Submitted/Rad primljen: 1. 6. 2022.
Paper Accepted/Rad prihvaćen: 1. 7. 2022.
10.5937/SJEM2202014K

Uticaj liderstva u javnom i privatnom sektoru

Andrijana Kaluđerović[1], Jovana Grbović[2]

[1]Elektroprivreda Crne Gore AD Nikšić, anakalu@yahoo.com
[2]Erste Bank AD Podgorica, jvngrubbovic@gmail.com

Apstrakt: Rad se bavi značajem liderstva. U radu se navodi koliko je uticaj lidera bitan u određenoj organizaciji. Poseban akcenat je stavljen na liderstvo u javnom i privatnom sektoru. Neophodnost liderskog upravljanja leži upravo u dinamičkom razvoju današnjeg društva. Svrha ovog rada je da istraži kakvo mjesto zauzimaju lideri u javnom sektoru, a kakvo u privatnom sektoru. Jedan od ciljeva je da se istakne uticaj liderstva u ovim sektorima koji je direktno povezan sa formulisanjem strategije kao načinom ostvarivanja ciljeva organizacije, gdje važnu ulogu ima produktivnost i zadovoljstvo zaposlenih. Kreirajući odgovarajuće ciljeve, kao i strategiju, lider utiče na čitav budući proces prilikom donošenja odluka, kao i njihovu realizaciju. U radu se koristi anketna metoda kako bi se došlo do konkretnih podataka o stavovima/mišljenjima ispitanika, o činjeničnom stanju, o budućim aktivnostima kojima bi se trebali baviti lideri, o načinu razmišljanja ispitanika i sl. Istraživanjem je obuhvaćeno 210 ispitanika, od kojih su svi bili punoljetni građani i pretežno građani koje interesuju dešavanja u državi. Neki od njih su i uključeni u važna zbivanja i nalaze se na mjestima odlučivanja. Shodno sprovedenoj anketi i rezultatima iste, dolazi se do određenih zaključaka: šta je potrebno preduzeti i kako se ponašati u budućem periodu, što će rezultati većem zadovoljstvu građana, tj. boljem kvalitetu života. Na osnovu istraživanja se može zaključiti i kakvo mjesto zauzimaju lideri u javnom sektoru, a kakvo lideri u privatnom sektoru na crnogorskom tržištu. Predočeno je i koje bi promjene/zadatke uspješno trebalo izvesti/ispuniti kada shvate da je konstantno učenje ono što liderima XXI vijeka omogućava ambiciozne ciljeve, visoke standarde, kao i pravi osjećaj misije u životu.

Ključne riječi: liderstvo, lider, javni sektor, privatni sektor, promjene/zadaci, misija.

Leadership Influence on the Public and Private Sector

Abstract: The paper is about leadership influence. It is stated how the influence of leaders is important in a certain organization. The emphasis is on leadership in the public and private sectors. The necessity of leadership management lays in dynamic development of today's society. The purpose of this paper is to explore what kind of place leaders occupy in the public and private sector. One of the goals is to emphasize leadership influence in these sectors, which is in direct relation with strategy formulation as the way of achieving the goals of an organization, where the productivity and satisfaction of employees play the important role. While setting appropriate goals, as well as the strategy, a leader affects the future decision-making process, as well as their realization. Also, there is a survey method in order to gain concrete data on attitudes/opinions of respondents, a factual situation, future activities that leaders should deal with, etc. The survey included 210 respondents, all of whom were adult citizens and primarily the citizens who were interested in the events related to their country. Some of them attend important events and also they are in the decision-making positions. According to the conducted survey and its results, we can conclude the following: what is necessary to undertake and how to behave in a future period, how the results may affect the better quality of life of citizens and their satisfaction. According to the survey, we can also conclude what kind of place leaders take in the public and private sector on the Montenegrin market. It is also stated which tasks should be completed after realizing that constant learning is what enables ambitious goals, high standards and a real sense of mission in the life of leaders of the XXI century.

Key words: leadership, leader, public sector, private sector, changes/tasks, mission.

1. Introduction

"Good games depend on good rules more than on good players."

James Buchanan

In this work the emphasis is on leadership in the public and private sector. Therefore, the emphasis is on a leader, i.e. on leadership that can be defined as behavior and an opportunity to affect the group of people with the aim to achieve determined goals of a certain organization/group. The subject of this research paper is analyzing the leadership, the behavior and actions of leaders, their influence on other members/employees in the public and private sector. Thus, the subject of the research is the leader and his activities which are essentially significant in the management strategy of human resources, which is considered to be the basic element for increasing efficiency and effectiveness in a certain organization. Also, it would be of great significance if leaders' activities were included and explained as much as possible, while confirming the negative effects of these activities. If all negative effects were removed, the work would be more efficient and results would be better. However, the relationships between a leader and members/employees, i.e. the communication between them is different in the public and private sector, which is the subject of this work as well – communication between the leaders and employees in the public and private sector. The leader and his influence on employees/members is one of the key points for the success of a certain organization.

The motive of the work, as its important part, is to research how the relations between the leaders and the members/employees of a certain organization (in the public and private sector) are built, which affects the organization itself. Relationship in leadership are in the focus of business of all companies, no matter what they do, whether they are public or private companies. Everything begins and everything ends with employees/followers who are the main reason that the company exists. Building a relationship between a leader and employees/members represents the process which lasts and which should be maintained continuously, and what is more important, it should be upgraded/supplemented. The research aim of this paper comes from its subject which says: the best way to understand the leadership both in the public and private sector is using all knowledge of approachable significant literature. The goal of scientific paper has been achieved through certain steps. Primarily, the cause of the appearance of the leadership and the analysis of three prominent sociologists who talk about this matter are stated. The steps that are necessary for the future are listed in order to improve employee satisfaction. Digitization of the process both in the public and private companies contributes to the significantly better integration of employees in the groups/organizations, i.e. it contributes to the exchange of knowledge and the skills as well, thereby increasing employee satisfaction (Nikezić et al., 2016). And finally, with the help of the research, we come to a conclusion about the level of trust in institutions, about needed leaders and subjects they should deal with. Apart from this, it can be determined what kind of the leadership position in the public and private sector is. It comes to a logical conclusion that a leader and a strategist usually identify with each other because of the nature of strategy and functions they perform. Therefore, there is an opinion that the leader is actually the strategist who manages the elements of strategy, such as: vision, mission, goals, values, organizational culture, activities and decisions. The leader integrates all of the mentioned elements of strategy into unique strategy. Thus, the leadership has the primary role both in the public and private sector, i.e. in all organizations. Without professional and high-quality leadership it is quite difficult and yet impossible to achieve good results. If the goals and motives of the leader's actions in the public and private sector are expressed, his basic needs and interests can also be determined.

The basic hypothesis which is going to be processed in the scientific work is:

- Leaders with highly expressed competencies in the private sector have significantly lower impact on employees, on their satisfaction, motivation and productivity in contrast to leaders in the public sector.

Leaders are the ones who can increase the satisfaction of employees with their skills, knowledge, characteristics, and with positive energy as well. In that way, leaders can direct them in order to achieve better organizational productivity. Based on the relevant literature, using the descriptive method, we obtain data that leaders in the private sector usually don't have a clear vision about using their competencies in the best way in order to achieve higher levels of employee satisfaction, which certainly creates an additional value for their organization, i.e. better performance.

The derived hypothesis that is going to be processed in this paper is as follows:

- The effectiveness of the leader's actions in order to achieve determined goals within a certain organization depends on his recognition of the right priorities (problems) which his employees/members face.

It is going to be answered to the given hypothesis using the qualitative method which deals with the analysis, market research as well as with survey data processing. Based on the data collected by the survey, leaders needed for Montenegro and priorities that should be in focus in the future period can be determined as well. Also, it can be determined what characterizes the relationship between leaders and their employees, i.e. the level of leaders' efficiency and their ability to recognize real problems that his employees deal with. Accordingly, concrete steps can be made, i.e. the projects and plans referring to the satisfaction of employees/members can be followed.

There are two survey methods used in this paper: descriptive and qualitative method. Beside the basic and derived hypothesis, descriptive method is also used for describing basic definitions of leaders, groups and types of leaders, the relationships between leaders and their employees/members in a certain organization, as well as the explanation of the leadership, i.e. the cause of the leadership itself. The third chapter of the work represents the survey analysis and the results. With the help of qualitative method, the market is analyzed, researched and the collected survey data are processed. Furthermore, descriptive method is also used for describing what leadership is like in the public and private sector, which includes four leadership styles, as well as the factors which have an impact on leadership, and therefore on leadership styles. This part describes the following: Which problems are characteristic for public companies? Which leadership style is the optimal solution for the public sector and which factors, apart from earnings, affect productivity? Both chapters have a clear aim, and that is to represent in the best way what the leadership and its influence is like in the public and private sector and what the similarities and differences of the mentioned sectors are.

2. Leadership influence in the public and private sector: similarities and differences

There are many factors that affect leadership, both endogenous and exogenous in nature (Bass&Bass, 2008). Leadership is characterized with many factors, and leadership styles depend on a situation in which companies can find themselves (Arsić, 2012). Thus, there are some of the factors (Branković & Zezelj, 2016):

- The size of a company, as well as the type of a company;
- Power structure;
- Characteristics and behaviour of leaders and employees;
- Environment;
- Task structure and nature of the task;
- Organizational and national culture;
- Organizational politics, etc.

Drawing a parallel between leadership in the public and private sector, we can recognize significant differences in leadership styles under the influence of these factors, as well as the situational ones (Barbuto, 2006). It is important to mention that effective leadership is the primary factor of a company's succes, whether it is a public or private company and regardless of its work, size, type, etc (Avolio, 2008). Of course, we can't take into account a fact that there is no universal formula/solution for effective leadership. There is a lot of definitions about leadership styles and its classification in professional literature. The *path-goal* model is the approach which is often mentioned and it is based on the thesis that leader is responsible to provide assistance to his employees /members in order to achieve results and goals and to provide support and necessary information so that the goals of a group or a certain organization become compatible with the goals of the followers (Robbins & Coulter, 2005). According to this theory, there are four leadership styles:

- Directive leadership;
- Participative leadership;
- Supportive leadership;

- Achievement- oriented leadership.

As stated above, the effectiveness of the leadership styles is conditioned by the factors of a situational nature.

Directive leadership is focused on concrete instructions so that the tasks can be completed, i.e. on defining roles and expectations. Thus, it is focused on announcing the employees/members about the expectations in concrete situations, determining the dynamics of work, standards, and last but not least, respect for rules and regulations (Williams, 2010). Directive leadership is an optimal solution for organizations, i.e. for their structure which is characterized with centralized decision – making, a great number of organizational levels and respect for authority as well (Stojanović-Aleksić et al., 2010). Therefore, it is about the type of leadership which is focused on efficiency. It is thought that directive style shows the direction and that there should be balance between this style and the style which "derives" from the individual their maximum/potential and which is known as a milder style. Also, it is stated that less capable individuals require more directive style, which means that more capable individuals require less directive style.

The second leadership style in line is *participative style or democratic style* which largely includes the followers in the decision-making process who are well-informed and show capability, trust, efficient cooperation and communication, and maturity. Before making certain decisions, the participative leader consults with his employees/members and together they consider all ideas. This style of leadership is used in the mentioned situations, but also in the situations when employees/members are not ready enough to take responsibility, so they need help and support in order to improve their motivation. Because of such behavior, the participative style of leadership includes a great number of positive sides because it affects employees/members, as well as creativity/innovation. It also increases employee commitment and satisfaction, which gives the best results. These results are easily recognized in situations where employees/members who possess specific knowledge and skills are not ready to take responsibility due to low self-confidence. Group work and their involvement in a decision-making process is an additional motivation for them to work on decision implementation. It is important to mention that this style also represents an effective solution. There are situations when leaders do not possess all required information, knowledge and skills. Thus, they need employee assistance. In such moments, it is necessary that employees are involved, as well as in the situations when they need more independence. The style is similar to consultative style of leadership, where leader depends largely on the group while making decisions, because everyone in the group has the same rights and questions and each opinion is valued. Leader respects and appreciates the opinion of everyone who is involved in the decision-making process and he directs communication. Brainstorming is often organized as well. Due to the efficient way of acting in practice, participative style is considered to be a dominant style which is used by modern managers. Therefore, it is often used both in medium and large companies. Employees in these organizations prefer this style more than other styles, because it gives them more possibilities and an internal locus of control which makes them more satisfied.

The third style of leadership is *supportive leadership* which represents a wider range of significant elements. Some of these significant elements referring to this type of leaders are listed below:

- Understanding;
- Offering help and assistance;
- Care for employees/followers;
- Having respect for employees/followers;
- Paying attention to followers.

This leadership style is well suited to companies where employees have insufficient self-esteem, do stressful jobs, etc. Also, this style can be suited to those companies that are prone to changes. Therefore, this style is not recommended to large groups, as well as for the employees/members who prefer directive leadership style and formal authority, and for those who possess great self-control and value autonomy. This is leadership which appears as the result of the satisfaction of employees/members while performing structured tasks. Also, as a result there are bigger satisfaction, motivation, efficient communication, group cohesion. All of this leads to the growth of performance, both individual and the performance of the organization itself. It comes to the conclusion that the supportive style means that the leaders care for their employees/members and support them, which increases job satisfaction, particularly when the conditions are not favorable.

And finally, the fourth leadership style is focused on achievement or success in which leaders set challenging goals, emphasize expertise/abilities and believe/expect that the employees/members will take responsibility, make an effort to achieve the goals and maintain a high standard of that performance, i.e. employee/member behavior. This is the style in which the leader aims to accomplish tasks, improves the work, encourages the employees/members to take on difficult tasks, encourages them to achieve higher standards of performance, as well as to raise their expectations so that the desired outcome can be achieved. Also, this type of leader is the one who gives a reward for excellent achieved results. In that way he encourages the employees/followers to improve self-confidence. Therefore, when the tasks are not clear and structured, this style raises expectations of the employees/followers that they can achieve good results only by their own effort and commitment. What is important to mention is that this type of leader possesses intrinsic motivation (self-motivation), which is creditable for perseverance and overcoming all obstacles and problems on the way while realizing defined/set goals. Also, that intrinsic motivation has positive effects on the environment creating a good work atmosphere.

Thus, there is a question now: Which of the listed four leadership styles is the optimal solution for public companies and which one for companies in the private sector?

When comparing leadership in the public and leadership in the private sector, it can be concluded that the leaders of public companies are much more exposed to public control in court in relation to leaders in private sector. The leaders of public companies have an economic responsibility, but they should take a social responsibility as well. They have a difficult task and that is to pursue many interests which are often opposed, because there are a state on one side and employees on the other side. It is necessary to fulfill/respect (to create values) the expectations of the state (which is also the employer of leaders in public companies) and the expectations of employees and consumers/citizens as well. Therefore, they are under the direct influence of political parties, which are meritorious for their positions, i.e. the leaders of public companies are named and dismissed by them in accordance with the interests of these political parties. Such circumstances, in which they act and which mean balance between different requirements, put the leaders of public companies in a situation where they often behave as if they were politicians, while the companies resemble the state administration. Such companies are mostly characterized as companies where the power and authority are concentrated at the top, as well as employee behavior which is standardized and formalized. In such kind of circumstances the management of public companies cannot be leadership oriented. It actually represents civil servants on whom the state as an employer delegates the authority for the operational management of the business (Petković- Janicijević et al., 2009). Due to the noticeable problems that characterize public companies, the effective leadership is questioned. Therefore, some of the problems that characterize public companies are (Branković & Zezelj, 2010):

- Performing negative selection;
- The principle of monopolistic position;
- Reward systems that are inadequate;
- Goals that are not clearly defined, etc.

Undoubtedly, the public companies are complex and large systems. For such systems, the preferred behavior style of leaders could be *participative leadership style*, i.e. people oriented leadership. Survey implementation that had the aim to see the differences in the leadership style between public and private companies showed that the listed four leadership styles are usually not present in small companies. According to the research, the first leadership style, directive leadership, is a dominant leadership style of companies in private sector. Employees in the private sector usually work according to the orders of their leaders and they are not involved in decision-making, which was discussed at the beginning of this chapter. There is a clear difference between companies in the public sector and companies in the private sector, when it comes to resolving conflicts, as well as in the decision-making approach. Leaders in public companies in the decision-making process are guided by advisory practice, and leaders in companies in the private sector are guided by analytical practice. It is important to mention that the leadership style is influenced by certain elements which are supported by members of a certain national culture, such as:

- Beliefs;
- Values;
- Attitudes;

- Norms, etc.

Therefore, national culture has an influence on many components and aspects of the leadership style and generally on management. When it comes to the influence of the national culture on management practice, the results of the research are often irrelevant, contradictory, quite confusing, and primarily when the influence of certain factors/elements of the culture are included in the research (Petković-Janicijević et al., 2002). Power distance and risk avoidance have the greatest influence on management practice. In cultures where a high power distance is present, i.e. where the unequal distribution of power and authority is acceptable, involving employees/followers and delegating authority in decision making is viewed by the employees as insufficient competence and powerlessness of the leader who is in charge for that type of job. Whereas, in the cultures where the power distance is low, autocratic, i.e. undemocratic style of leadership is viewed negatively by the citizens. Also, in states, with high uncertainty avoidance, employees are not ready to accept the risk and take responsibility. Thus, they perceive innovation in negative way. Consequently, employees value safety at work more and accept changes more difficult, i.e. they do not change their job easily (Milijić et al., 2019). When the influence of numerous elements on management practice is taken into account, the optimal solution for the public sector is integrated leadership. This leadership concept includes five roles (Hassler et al., 2021):

- Task- oriented leadership;
- Realtionship-oriented leadership;
- Leadership focused on changes;
- Diversity- oriented leadership;
- Leadership focused on integrity.

It is important to emphasize that the efficiency and effectivennes of public and private companies, which are the subject of this scientific work, are threatened by various factors. Some of these factors can be attributed to human resources management, because there were numerous abuses of positions and power, as well as negative selections during employment, using ineffective system of motivation and rewarding eligible ones. All these phenomena are emphasized as a dominant way of behavior in public companies. It often happens that key individuals in these public companies who are decision-makers do not have enough knowledge, skills and abilities, i.e. they lack experience as well as leadership skills. There are other differences between public and private companies, which are material incentives that leaders in the private sector give to their employees, while leaders in the public company do not have that type of incentive but they have other factors that motivate their employees, such as job security. Due to these factors, public companies in developed countries are not sufficiently attractive to highly qualified cadres which show a growing interest in private companies.

If we focus on Montenegro, public companies are still attractive to work for. There are more reasons for being interested in these state-owned enterprises, such as:

- Primarily, job security;
- An opportunity for development;
- An opportunity for improvement;
- Various benefits, such as social, etc.

There is, even much more than expected, a great number of employees in public companies in our country. Regardless of the achieved results, they have high and regular incomes/ salaries (Stosic & Djukic, 2016). The public sector can be viewed and divided into two segments:

- The general government sector;
- The sector of public companies.

There are studies which show the key factors of motivation, i.e. demotivation of employees in the public sector. The studies have similar results: low salaries (inadequate salary) are a key factor affecting the demotivation of employees in the public administration. Also, there are other factors that demotivate employees, such as (CEP, 2016):[1]

[1] The official website Centar za evopske politke- CEP (2016). The official website https://cep.org.rs

- inconsistency of responsibility and level of work;
- workload;
- work under pressure/stress, etc.

Research related to public companies, where earnings are also crucial for increasing productivity at work, showed the same. Beside earnings, there are some other factors that affect productivity (Lekić-Bubanja et al., 2014):

- good relationships with the leader;
- greater independence in work and decision-making;
- better informing about issues related to the future of the company;
- the possibility of professional improvement;
- the motivation and reward system.

When we talk about the management of the public company, which is an integrated electricity company of Montenegro (EPCG), it is necessary to understand the relationship between employee behavior and the compensation system in order to achieve more efficiency and effectiveness. In this public company, it is necessary to implement the right concept of rewarding leaders and employees, just like in other companies in the public sector. The key task of the leader is to create an effective system of motivation and compensation. Employees who have high work potential bring such system and because of such an adequate compensation system they maintain their performance at a high level. Basicaly, everything revolves around the amount of employee salary. The salary is what affects employees' satisfaction, their willingness to learn, improve and to acquire new knowledge and skills. Also, it affects their attitude towards clients, the very quality of work, readiness for changes, innovations, as well as their attitude towards trade unions and their interest in possible legal actions against the employer (Bogdanović et al., 2016).

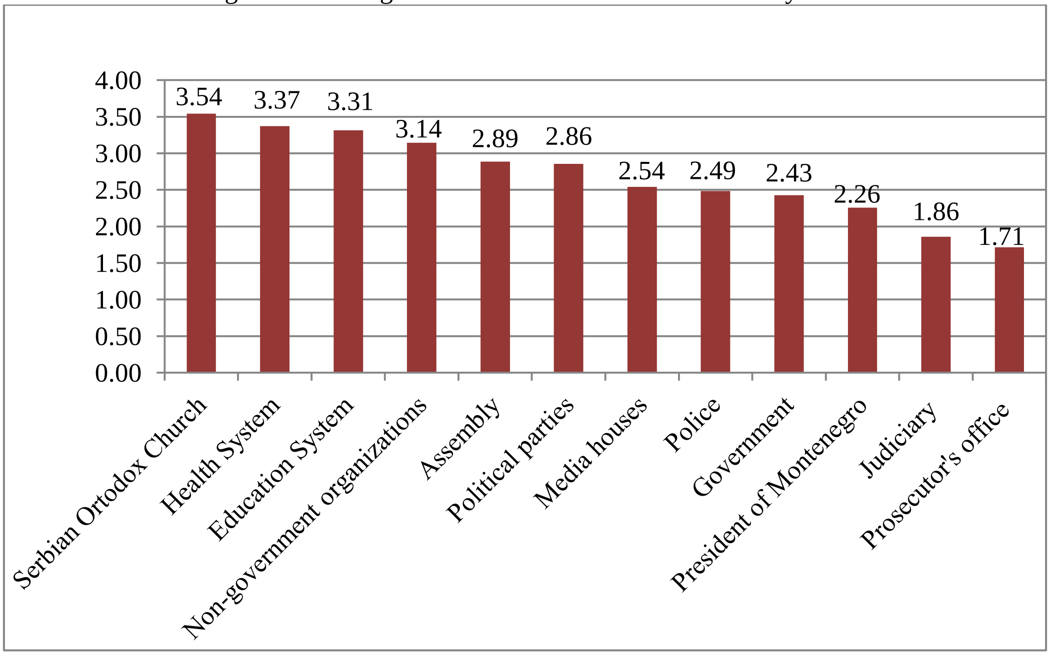
3. The survey results and analysis

Surveys are conducted in order to obtain certain information/data, which are used as research on a given topic and the results obtained by the respondents will be presented in this research paper. This method is the most common and it is often used in practice/research, as well as in this work. The survey method is used in order to obtain concrete data about attitudes/opinions of the respondents, about the factual situation and the future activities that should be dealt by leaders, about the way of thinking of the respondents, etc.

The survey included 210 respondents, all of whom were adult citizens and mostly citizens interested in the events of their country. Some of them are involved in important events and are in decision-making positions. The survey contains fifteen questions, five of which are general, and ten questions are about leadership topics, specifically leadrship in Montenegro. The survey method showed that the citizens of Montenegro had the greatest trust in Serbian Ortdodox Church, yet the key problem that leaders should deal with in the future is unemployment. It is important to note that 34% of respondents are members of a certain political party or a non-governmental organization.

Figure number 1 shows trust levels in the institutions of the system. Respondents rated twelve instiutions from one to five. They showed the highest trust in the SPC (Serbian Ortodox Church). Therefore, the SPC is the institution which has the highest trust according to the answers of 210 respondents. The second place was taken by the Health System. This was expected due to the overall situation in the country, where the current topic is the signing of the Basic Agreement with the SPC, as well as the situation related to the COVID-19. And the Education System takes the third place. Trust in the judiciary and the prosecutor's office is the lowest due to the prolonged blockade of the Prosecutor's Council.

Figure 1: The degree of trust in the institutions of the system

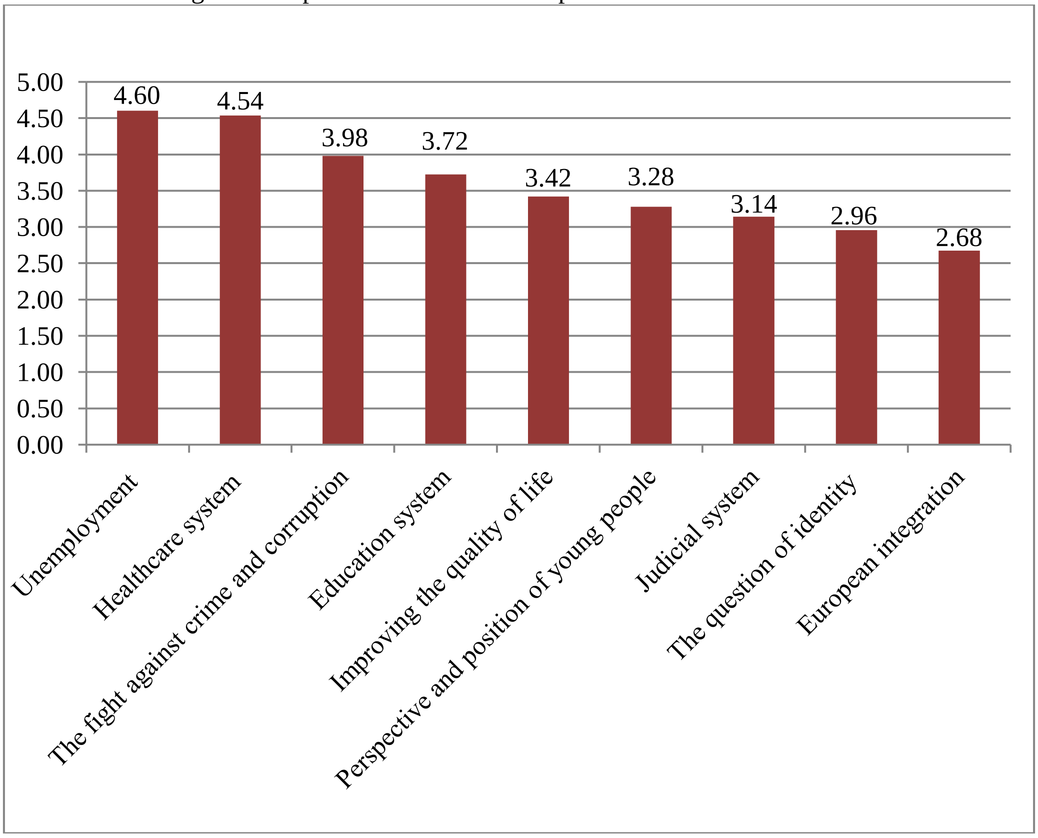


Source: (Author, 2022)

Figure number 2 shows topics as priorities for leaders, i.e. topics that leaders should prioritize in their future activities. Respondents rated nine topics from one to five, where the review of all topics and their ratings from highest to lowest was given. An important fact is that the respondents emphasized unemployment as a priority topic. According to the monthly report of the Employment Agency of Montenegro in April 2022, the unemployment rate was 21.79%. It is a burning issue for Montenegro where leaders should primarily deal with it. The healthcare system is secondary due to the overall situation with pandemic in the country.

The question of identity is penultimate, and European integration takes last place. The subject of the Europian Integration was given the lowest rating by the respondents, due to the fact that accession of Montenegro to the EU is not questioned. Considering the fact that about 80 % of Montenegrin citizens want to join the countries of Europe, it is clear that the EU is everyone's priority. Thus, the emphasis will be on the improvement and the solution of problematic chapters 23 and 24, so that Montenegro can become the member of Europian Union as soon as possible.

Figure 2: Topics that leaders should prioritize in their future work

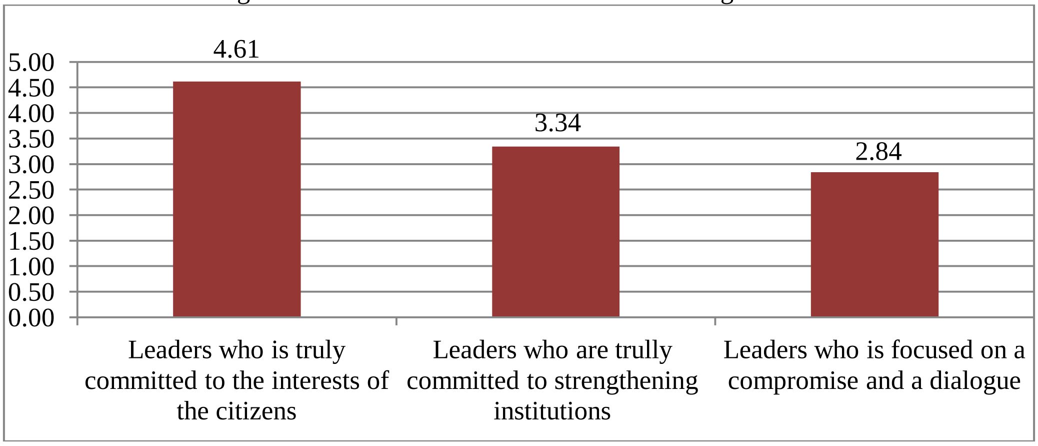


Source: (Author, 2022)

Figure number 3 shows what kind of leaders Montenegro needs. There are three types of a leader that are considered to be necessary for Montenegro. The type of a leader who is truly committed to the interests of the citizens was given the highest grade.

Thus, leaders who truly want to deal with the citizens and listen to them, who want to solve their problems and deal with their interests and needs take first place.

Figure 3: What kind of leaders should Montenegro have?

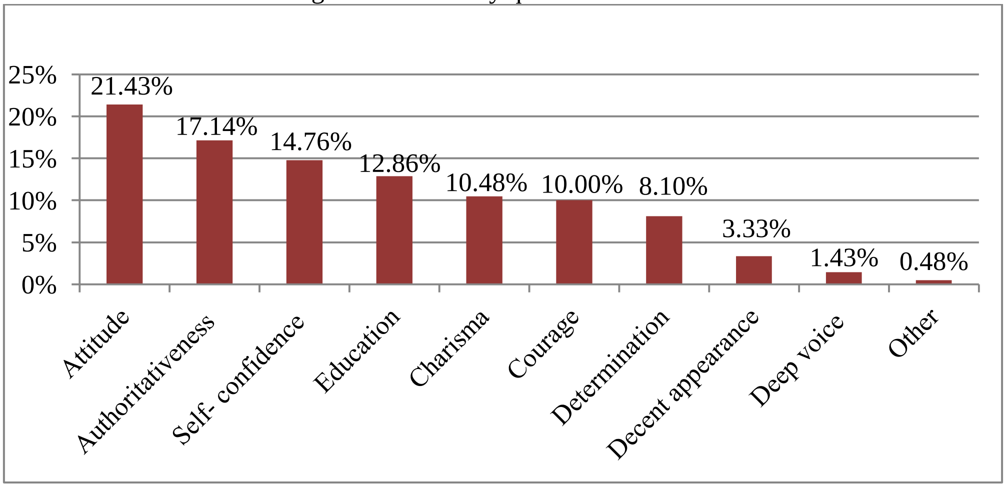


Source: (Author, 2022)

Primarily, they want to focus on the living standard of citizens. Leaders who are trully committed to strengthening institutions take second place. It is a very important subject for our society in which the institutions will be unblocked, as it is the case with the prosecution. Therefore, the institutions of the system will be independent in their work and everyone will be equal before the law, i.e. there will be no privileged ones. And lastly, the type of leader who is focused on a compromise and a dialogue is the lowest-rated one.

Figure number 4 shows the necessary qualities of a leader. The respondents stated the qualities that are considered to be necessary for a leader, where an attitude as the style of behavior takes first place. The largest number of respondents (21%) think that an attitude is a quality that a leader must possess. Authoritativeness with 17% takes second place, which is followed by self- confidence in its third place with almost 15%. Then, there is a deep voice with the lowest percentage, which is stated as necessary for leaders, while the term "other" (0.48%) refers to some other quality that is considered to be necessary for a leader.

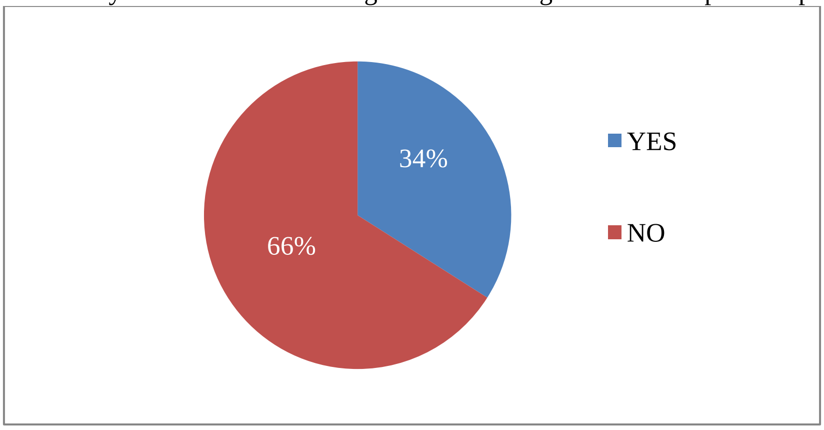
Figure 4: Necessary qualities of a leader



Source: (Author, 2022)

And finally, figure number 5 shows belonging to a non-governmental organization or a political party, where the respondents replied with Yes and No. According to the pie chart, it can be concluded that 34% of the respondents involved in this survey belong to a certain political party or a non-governmental organization. Therefore, the survey showed that every third respondent is a member of a certain political party/non – governmental organization.

Figure 5: Are you a member of a non-governmental organization or a political party?



Source: (Author, 2022)

All of the above idicates that leadership in the public and private sector must strengthen and show a sense and openess towards the needs of the Montenegrin citizens. According to the conducted survey and its results, we come to certain conclusions -- what needs to be done and how to behave in the future period. Therefore, it will result in greater satisfaction of the citizens, i.e. better quality of life. Although this method has included a sample of 210 respondents, the survey certainly helps to view the situation in the country and then to take certain steps: What should be done and how should leaders approach those who put them in key positions in Montenegro. The survey was conducted in a dynamic period of the country. Therefore, changes regarding the issues are expected in the future.

4. Conclusion

"A leader is best
When people barely know he exists,
Not so good when people obey and acclaim him,
Worse when they despise him,
But of a good leader, who talks little,
When his work is done, his aim fulfilled,
They will say: 'We did it ourselves.'"
Tao Tzu

The necessity of leadership management lies precisely in the dynamic development of today's society. Leadership and changes are synonymous (Hassler et al., 2020). According to the quality of interpersonal relations between the leader and his members (collaborators), there are resonant and dissonant leaders. Primalrily, the job of a leader includes tasks that are not urgent, but important (Bono &Anderson, 2005). An effective leader possesses developed emphatic abilities, as well as emotional intelligence (Fernandez et al., 2010).

An effective leader percieves differences between people as constants what makes him derives advantages from that. An excellent leader develops qualities that makes him above average and he strives to bring them to perfection (Dionne et al., 2005). His philosophy of effectiveness is: "Strengthen the qualities you are good at." Leaders are the ones who can increase employee satisfaction using their skills, knowledge, characteristics and positive energy (Gelfand et al., 2007). In that way, leaders direct them in order to achieve greater organizational productivity. It can be concluded that leaders in the private sector usually have a clear vision of how to use their competencies in the best way in order to improve employee satisfaction, which creates additional values for their organization, i.e. better performance. Based on the above, the basic hypothesis in this research paper has been confirmed: Leaders with highly expressed competences in the private sector have much stronger influence on employees, on their satisfaction, motivation and productivity compared to the leaders in the *public sector.* Today, we see the prevailing opinion is that in every organization it would be more than helpful to combine these two roles/functions (leader&manager), because they are functionally and generally different. Drawing a line between these two roles/functions can determine the following – there are two important items for every leader, such as:

- *Effectiveness* which is a representation of the vision and directs organizational energy in a certain direction;
- *Efficiency* that refers to executive actions, as well as certain procedures.
- Therefore, it refers to the ways in which defined, concrete work/tasks are performed.
- There are some qualities that a leader must possess in order to be effective:
- self-awareness: to have emotional self-awareness, to know to evaluate himself accurately, and of course, to have great self-confidence;
- Self-management: to have self-control, to be transparent and adaptable, to strive for success, to be proactive and optimistic;
- Social awareness: to have empathy, to be awared of political party or organization, to be open-minded;
- Relationship management: to be inspirational, to have influence and the ability to improve life of other people, to be a change catalyst, to manage conflicts, to have a team spirit and to encourage teamwork as well as cooperation (Levy et al., 2019).

On the basis of the summarized statement, we can determine that the hypothesis in this research paper has been confirmed: *The level of effectiveness of the leader's actions in order to achieve defined goals within certain organization that he manages depends on his ability to recognize real priorities (problems) that his employees/followers face.*

In this way, the given aim is achieved. However, there is still a feeling that the door is slightly opened and that the path which is very long leads to deeper and more significant problems within modern societies, which arose from the need for more true leaders on the global-political scene. Being a leader today requires continuous learning, improvement and constant reading of various siginificant literature, because only a well-informed, prepared, always ready and educated leader can hope that he will succeed and achieve the goals that he put in front of himself years ago. Leaders of the 21st century are faced with jobs/tasks that they will successfully achieve if they realize that constant learning is what enables them to have high standards, ambitious aims and a real sense of mission in life.

Bibliography

1. Arsić, M. (2012). Reforms of state and social enterprises. *Quarterly monitor of economic trends and policies in Serbia*, 2012: 28.
2. Arsić, M Pejić, M. (2011). New fiscal rules for improving public debt control in the EU. *Quarterly monitor*, 2011: 27.
3. Arvey, RD. Zhang, Z. Avolio, BJ. Krueger, RF. (2007). Developmental and genetic determinants of leadership role occupancy among women. *J. Appl. Psychol*. 92:693–706.
4. Avolio, BJ. Chan, A. (2008). The dawning of a new era for genuine leadership development. In *International Review of Industrial and Organizational Psychology*, ed. G Hodgkinson, K Ford, pp. 197–238. New York: Wiley.
5. Avolio, BJ. Luthans, F. (2006). *The High Impact Leader: Moments Matter in Accelerating Authentic Leadership*. New York: McGrawHill. 273 pp.
6. Barbuto, JE. Wheeler, DW. (2006). Scale development and construct clarification of servant leadership. *Group Organ. Manage*. 31:300–26.
7. Dobardžić, A. (2019). Public-private partnership: A model for improving the efficiency of the public sector in the Republic of Serbia. State University in Novi Pazar, Department of Economic *Sciences*, vol. 2, br 2, 94-109.
8. Bass, BM. Bass, R. (2008). *Handbook of Leadership: Theory, Research, and Application*. New York: Free Press. 1296 pp.
9. Bogdanović, D. Stanković, V. Urošević, S. Stojanović, M. (2016). Multicriteria ranking of workplaces regarding working conditions in a mining company. *International journal of occupational safety and ergonomics*, *vol. 22 br. 4*, str. 479-486, ISI/Web of Science.
10. Bono, JE. Anderson, MH. (2005). The advice and influence networks of transformational leaders. *J. Appl. Psychol.* 90:1306–14.
11. Branković, M. Rogoza, R. Schermer, J. A. (2022). Humor styles in Serbia: an evaluation of the Humor Styles Questionnaire and correlations with social attitudes. *Current psychology*, ISI/Web of Science.
12. Branković, M. Zezelj, I. (2016). Does it take a good argument to be persuaded? How manipulating quality of evidence affects message persuasiveness. *Psihologija*, vol. 49 br. 1, str. 1-18, ISI/Web of Science.
13. Branković, M. Zezelj, I. (2010). The Effects of Matching a Persuasive Message to a Recipient's Self-Concept on Attitude Change. *Psihologija*, vol. 43 br. 3, str. 233-251, ISI/Web of Science.
14. Čerović, S. (2011). *Upravljanje ljudskim resursima u hotelijerstvu.* Beograd: Univerzitet Singidunum.
15. Dionne, SD. Yammarino, FJ. Howell, JP. Villa, J. (2005). Substitutes for leadership, or not. *Leadersh.* Q. 16:169–93.
16. Fernandez, S., Cho, Y.J., Perry, J.L. (2010). Exploring the link between integrated leadership and public sector performance. *Leadership Quarterly*. No. 2. pp. 308-323.
17. Gelfand, MJ. Erez, M. Aycan, Z. (2007). Crosscultural organizational behavior. *Annu. Rev. Psychol.* 58:479–514.
18. Hässler, T., Ullrich, J., Sebben, S., Shnabel, N., Bernardino, M., Valdenegro, D., Van Laar, C., González, R., Visintin, E. P., Tropp, L. R., Ditlmann, R. K., Abrams, D., Aydin, A. L., Pereira, A., Selvanathan, H. P., von Zimmermann, J., Lantos, N. A., Sainz, M., Glenz, A., Kende, A., … Pistella, J. (2022). Need satisfaction in intergroup contact: A multinational study of pathways toward social change. *Journal of personality and social psychology*, 122(4), 634–658. https://doi.org/10.1037/pspi0000365
19. Hässler, T., Ullrich, J., Bernardino, M., Shnabel, N., Laar, C. V., Valdenegro, D., Sebben, S., Tropp, L. R., Visintin, E. P., González, R., Ditlmann, R. K., Abrams, D., Selvanathan, H. P., Branković, M., Wright, S., von Zimmermann, J., Pasek, M., Aydin, A. L., Žeželj, I., Pereira, A., … Ugarte, L. M. (2020). A large-scale test of the link between intergroup contact and support for social change. *Nature human behaviour*, 4(4), 380–386. https://doi.org/10.1038/s41562-019-0815-z
20. Ilić, D. Ostojić, S. Damnjanović, N. (2014). The importance of marketing innovation in new economy. *Singidunum Journal of Applied Sciences* 11.1, 34-42.

21. Krstić, N. (2015). *Digitalni marketing: pojmovnik*. Beograd: Fakultet za medije i komunikacije, Univerzitet Singidunum.
22. Lekić, S., Vidas-Bubanja, M., Bogetić, S. (2014). *Motivacija zaposlenih kao pokretačka snaga razvoja savremenih organizacija.* Beograd: MESTE.
23. Levy, A. Zezelj, I. Branković, M. Dušanić, S. Zomeren, M. Saguy, T. Halperin, E. (2019). Complex Social Identities and Intergroup Relations Gateway Groups in the Western Balkans. *Social psychology, vol. 50* br. 3, str. 201-206, ISI/Web of Science.
24. Marasević, J. Gavrovska, A. (2020). Virtual Reality and WebRTC implementation for Web educational application development. 28th telecommunications forum (TELFOR), str. 268-271, ISI/Web of Science, Serbia.
25. Marinković, V. (2013). Do switching barriers of a service company moderate the relationship of perceived image and its antecedents? *Marketing* 44.1, 39-48.
26. Mašić, B., i dr. (2009). *Menadžment.* Beograd: Univerzitet Singidunum.
27. Mihailović, B. (2013). *Marketing.* Podgorica: CPI.
28. Milijić, N. Bogdanović, D. Nikolić, I. (2019). Projects in Industry 4.0 framework and its effects on occupational safety. *Proceedings of the 5th IPMA senet project management conference, vol.* 108 br. , str. 92-97, ISI/Web of Science.
29. Nikezić, S. Dželetović, M. Vučinić, D. (2016). Organisational-Management Code for the 21st Century. *13th international symposium in management: management during and after the economic crisis, vol. 22*1 br., str. 126-134, ISI/Web of Science.
30. Northaus, P. (2008). *Liderstvo, teorija i praksa.* Beograd: Data Status.
31. Nutt, P. (2006). *Comparing Public and Private Sector Decision.* Making Practices. J. Public Admin. Res. Theory.
32. Pavićević, V. (2016). *Izborni sistemi.* Podgorica: Ekonomski fakultet.
33. Petković, M., Janićijević, N., Bogićević, Milikić, B. (2009). *Organizacija i menadžment ljudskih resursa.* Beograd: Ekonomski fakultet.
34. Petković, M., Janićijević, N., Bogićević, B. (2002). *Organizacija: teorije, dizajn, ponašanje, promene.* Beograd: Ekonomski fakultet.
35. Pešić, M. (2007). *Sociologija.* Beograd: Univerzitet Singidunum.
36. Robbins, P.S., Coulter, M. (2005). *Menadžment.* Osmo izdanje. Beograd: Data status.
37. Rot, N. (2006). *Psihologija grupa.* Beograd: Zavod za udžbenike i nastavna sredstva.
38. Stojanović-Aleksić, V., Šapić, S., Erić, J. (2010). *Efektivnost liderskih stilova*. Kragujevac: Ekonomski horizonti.
39. Stošić, I., Đukić, M. (2016). Potrebe i izazovi restrukturiranja javnog sektora Srbije: In. *Pravci strukturnih promena u procesu pristupanja Evropskoj uniji.* Beograd: Institut ekonomskih nauka.
40. Urošević, S. Milijić, N. Đorđević-Maljković, N. Karabašević, D. (2016). Indicators of Motivation and Employee Satisfaction in Public Enterprise – Case Study of PE “Post of Serbia”, *Industrija, Vol.44, No.3.*
41. *Veselinović,* P. (2014). *Public sector reform as a key determinant of the success of the transition of the economy of the Republic of Serbia.* Faculty of Economics, University of Kragujevac, Economic Horizons, May - August 2014, vol. 16, 141 - 159.
42. Vlahović, S. (2008). *Liderstvo u savremenim organizacijama.* Podgorica: CID.
43. Williams, M. (2010). *Leadership for leaders.* London: Thorogood Management Books.

Internet source:

1. Centar za evropske politike - CEP. (2016). https://cep.org.rs/.

Review Scientific Paper/Pregledni naučni rad UDC/UDK: 355.4:005.57]:32.019.5
327.8:[004.738.5:316.774
Paper Submitted/Rad primljen: 3. 5. 2022.
Paper Accepted/Rad prihvaćen: 1. 7. 2022.
DOI: 10.5937/SJEM2202027B

Izazovi malih država u pogledu razvoja sposobnosti informacionog delovanja

Hatidža Beriša[1], Vinko Žnidaršič[2], Milan Miljković[3]

[1]School of Engineering Management, hatidza.berisa@mod.gov.rs
[2]Military Academy, University of Defense, vinko.znidarsic@gmail.com
[3]School of National Defense, University of Defense, milanmiljkovic04011@gmail.com

Apstrakt: Predmet rada je da da sažet pregled, trenutnog stanja sposobnosti „malih država“ da sprovode informaciona dejstva, specifičnih sposobnosti neophodnih za informaciono delovanje. U kontekstu „malih država“ opisani su osnovni izazovi njihovog razvoja i analiziran njihov razvoj. Takođe, dat je kratak kritički osvrt na teorijske i doktrinarne osnove informatičke delatnosti institucija Republike Srbije. Akcenat u opisu sposobnosti stavljen je na one koje se sprovode informativnim i perceptivnim metodama (propaganda, upravljanje percepcijom protivnika, dezinformacije, psihološke operacije, obmana), na one koje se izvode informacionim i tehničkim sredstvima (napadima na kritične objekte nacionalne infrastrukture, sajber-napadi), upravo zbog njihove dominantne osnove zasnovane na znanju, dobroj organizaciji i korišćenju lako dostupnih resursa i sredstava, a ne na tehničko-tehnološkoj nadmoći, velikim materijalno-finansijskim ulaganjima i skupoj tehnologiji koja je nedostižna za „male države”.

Keywords: država, sposobnost, internet, informacija, informaciono delovanje.

Challenges of Small States for Informational Action in Regard to Capacity Development

Abstract: The issues of the paper are given a concise overview, of the current state of capabilities of "small states" for informational action. In the context of "small states" specific abilities necessary for informational action are described and the basic challenges of their development analyzed. Also, a brief critical review of the theoretical and doctrinal bases of the information activity of the institutions of the Republic of Serbia is given. The emphasis in the description of capabilities is on those that are carried out by informative and perceptive methods (propaganda, managing the perception of the opponent, disinformation, psychological operations, deception), about those that are carried out by informational and technical means (by attacking critical objects of the national infrastructure, cyber-attacks), precisely because of their dominant base on knowledge, good organization and the use of easily available resources and means, and not on technical-technological supremacy, large material-financial investments and expensive technology, unattainable for "small states".

Keywords: state, ability, internet, information, information action.

1. Introduction

The modern age in which we live is also called the information era, because it is characterized by the ability of individuals to freely exchange information and to have a quick access to knowledge, which was previously difficult or even impossible. Its main determinant is the increased speed and efficiency of information transmission, which, thanks to information and communication technology, has become greater than the speed of physical movement. In a broader sense, the beginning of the information age coincides with the invention of telegraph in 1837, and it experiences its full momentum with the establishment of a global system of computer networks - the Internet.

According to Francis Domingo, the implementation of an appropriate strategy is crucial for the survival of small states. "Since it cannot shape its environment by force, a small state must rely on a range of strategies that suit its capabilities and characteristics." Given that "the massive spread and application of information and communication technology provides all actors in the conflict with different types of opportunities, which were once available only to developed states and their security forces", it can be concluded that the size of the state does not significantly affect the capabilities necessary for information action.

However, when it comes to "small states", including the Republic of Serbia, it can be said that they were most often the object of informational action by "big powers", which, in accordance with their hegemonic-offensive strategies, openly or covertly exerted pressure and influence in the informational dimension of the operational environment, with the aim of realizing the proclaimed interests and goals. This is how, for example, western countries carried out offensive information operations in which the mass media played an irreplaceable role many months before the aggression against the Federal Republic of Yugoslavia in 1999. With the aim of convincing the entire world public opinion of the correctness and alleged humanity of the Western military intervention, phrases, words, qualifications and other important determinants were carefully chosen to demonize the Serbs and the Federal Republic of Yugoslavia. For example, Serbs are constantly presented as bullies and occupiers of Kosovo, NATO used the term "air campaign" and not aggression, etc. On the other hand, the activities of the Federal Republic of Yugoslavia in the informational dimension of the operational environment were not sufficiently organized, centralized and managed on time, which is why, at the beginning of the aggression, the General Staff of the Army of Yugoslavia had to take significant measures to compensate for these weaknesses.

2. Conceptual definition of small states in the context of information activities

The process of re-emergence and reaffirmation of small states intensified after the Second World War, due to the process of global decolonization (Archer, C. Bailes et al., 2014), as well as the end of the "Cold War" and the collapse of the Soviet Union and Yugoslavia at the end of the 20th century. Despite this phenomenon and the increased attention of scholars, no single criterion or definition has been achieved that characterizes the term small states.

Distinguishing countries according to their capacities and strength often implies a more detailed structural analysis, which would include several elements, such as territory, population, economic potential, geopolitical position and, of course, the country's military potential. In recent times, the difference between "hard power" and "soft power" of a country (general influence that a country can create through politics, diplomacy, culture, non-state ties, etc.) has been emphasized. Therefore, the concept of a small state is a relative term, and the qualification of a state can only be done by comparing it with other states - states in a certain context and according to selected criteria (Björkdahl, 2008).

With globalization, that is, with the increasing role of "soft power", the question arises to what extent the difference between "smaller", "medium" and "larger" countries is relevant in general (Lopandić, 2010). Namely, the fact that modern achievements in the field of technology, media and communication have become available to poor countries, contributes to the possibility of equalizing competitive, but also stronger and weaker countries in mutual competition. This can lead to the "nullification" of the military principle of mass, i.e. to the point that military power is no longer decisive in measuring the total power between two or more states. The weapons of the information age help small nations against the big ones and favor the "weak" over the "strong" (Miljković, 2010).

The enormous possibilities of modern technologies for disseminating information and reaching an unlimited number of users are very suitable for informational action and spreading the desired influence. Today, the Internet is one of the most prevalent means of creating effects related to information, with the possibility of taking complete primacy in the near future in relation to all other means. Computer equipment, as well as access to the Internet, is available to all countries, as well as to the majority of the world's population, with the tendency to continue the expansion of global networking. Over time, the Internet has become an independent and free social creation: According to the official definition established at the World Summit on the Information Society, Internet governance is the development and application by governments, the private sector and civil society, in their specific services. Common principles, norms, rules, decision-making procedures and programs shape the evolution and use of the Internet (Van Eeten, & Mueller, 2013). Therefore, one of the most powerful information and communication technology tools of today is also available to "small" states for exerting influence through informational activities and achieving certain goals and interest.

3. The Federal Republic of Yugoslavia's experience in information activities during the 1999 NATO campaign

Observed from a historical perspective, it can be stated that information and informational action were of great importance during modern armed conflicts, including during the NATO campaign against the Federal Republic of Yugoslavia in 1999. Due to insufficient capabilities to respond militarily to airstrikes, the Federal Republic of Yugoslavia actively used its own media, foreign journalists and the influence of the Internet to influence global and regional public opinion around the world in order to achieve a strategic national interest - the preservation of state sovereignty and territorial integrity. "In order to realize the stated strategic goal, the establishment of Federal Republic of Yugoslavia had to achieve three operational goals through informational action: 1) maintaining domestic support for security forces' operations in Kosovo and Metohija and countering NATO attacks; 2) creating discord between NATO members and influencing their determination to wage war and 3) gaining the support of the international public" (Putnik, 2012). "During the conflict between the Federal Republic of Yugoslavia and NATO, both sides in the conflict, in an effort to reach a wider audience, dominantly used the Internet (Vuletić, 2004) as a medium for conducting information operations."

The government of the Federal Republic of Yugoslavia and the RTS were, among other things, able to cover the whole of Europe through the leased communication link of the EU and for the program of the state television to be rebroadcast in the United States of America on Cable-Satellite Public Affairs Network (C-SPAN) (Ramirez, 1999). Federal Republic of Yugoslavia propaganda is integrated into the reports of friendly and neutral media, as well as all conservative media forums critical of NATO. The information activities of the Yugoslav Army were in some way supported by Western television and news agencies, which used the Serbian media as a source in their reports. In the later period of the conflict, the Internet became the primary media for the Serbian side's information activities, bearing in mind that the Alliance managed to gradually cut off Serbian radio and television communications with the rest of the world. The Internet has been used in various ways. Dozens of pro-government oriented websites in English were created, on which information content about the illegality of NATO campaign and crimes committed by the Alliance were regularly published. Emails were sent to influential people in the West from the spheres of politics, business and culture, as well as to foreign media, about the injustice of NATO campaign and cases of the so-called collateral damage. Thus, within 15 minutes of the bombing of the Chinese embassy, Stratford, a private intelligence company, received five emails describing the attack from people living near the embassy (Friedman, 1999).

The Serbian side also used foreign media in such a way that it was very active in foreign online "chat rooms". This form of communication provided the attacked party with greater influence on the wider world public than television interviews (Harmon, 1999). Communication by e-mail and through social networks became an integral part of the early warning network, and they were widely used to send a huge number of messages about immorality, illegality and committed crimes of the aggressors to the general public. The proclaimed goals were partially achieved, the morale and unity of the own forces was preserved, and media messages different from NATO propaganda were sent to the world. Those images stirred up pro-Serbian and anti-war activists across Europe and Russia, leading to protests and demonstrations against the United States of America and NATO.

However, the measures taken had a limited effect in the fight against NATO's information supremacy and its extremely aggressive political-diplomatic and military offensive against the Federal Republic of Yugoslavia. After 78 days of constant air operations and intense diplomatic pressure, the Alliance appeared to have achieved victory, largely thanks to airstrikes. Nevertheless, persistent, decisive and effective defence by conventional means during the NATO campaign, combined with the execution of information operations, created the conditions for the preservation of the Autonomous Province of Kosovo and Metohija in the composition of the Republic of Serbia by peaceful and political means. It must also be noted that the measures taken by the Federal Republic of Yugoslavia were not sufficiently organized, centralized and managed in the beginning. That is why the General Staff of the Army of Yugoslavia undertook significant activities to compensate for these weaknesses.

At the beginning of the bombing of the Federal Republic of Yugoslavia, an interdepartmental ministerial coordination group for informing the foreign public was formed and the initial principles for the management and direction of the Press Center at the Directorate of the Headquarters of the Supreme Command, the strategic basis of the defensive information-propaganda war, the instructions for the work of foreign correspondents in the Federal Republic of Yugoslavia in wartime conditions and other acts (Matić, 2005). Later analyzes indicate that the foreign public had the most unfavorable opinion of the Army of Yugoslavia at the beginning of the war, more favorable as the NATO campaign continued, and the most favorable at the end of the war, which indicates the positive effects of the Federal Republic of Yugoslavia's information activities during the NATO campaign (Stanković, 2000). The conclusion is that the aforementioned lack of organization of forces for informational action before the start of the NATO campaign influenced the weaker initial effects and results, which were later improved by the aforementioned measures.

At first glance, it may be difficult to see the manipulation of the media and the exploitation of the Internet as a coherent campaign of information operations of the Yugoslav Army. Indeed, the efforts of the Federal Republic of Yugoslavia government to shape international public opinion seemed primitive compared to the capabilities of modern information operations based on cyber weapons and attacks on computer networks. And yet, these efforts were effective (Putnik, 2012). The information activities of the forces of the Federal Republic of Yugoslavia were primarily realized by information-perceptive methods, that is, by sending appropriate media messages to target groups. Since NATO managed to gradually cut off Serbian radio and television communications with foreign countries, the Internet became the primary means of regime propaganda, with the aim of influencing the perception of enemies, allies and the domestic public. The aforementioned concept and experience will be the basis for further analysis of the development of the capabilities of small states for informational action.

4. A general overview of the state of capabilities of "small states" in the Balkan region for informational action in relation to the "great powers" of the West

Countries that are successful on the global level, and especially those that want to ensure hegemony and dominance in the world, are leading in the development of strategies, doctrines, infrastructure and institutions for informational action. Thus, in 1984, the United States of America President Ronald Reagan signed a decree (NSDD 130) defining the status of United States of America information policy abroad, as well as the importance of information operations in fulfilling long-term national goals: "International information is an integral and vital part of the national security policy and United States of America strategy in the broadest sense. Together with other areas of public diplomacy, they are a key strategic instrument for shaping on a long-term basis fundamental political and ideological trends throughout the world, and ultimately influencing the behavior of governments" (Reagan, 1984).

On the other hand, "small states", compared to hegemons such as the United States of America, act defensively or passively in the information environment and consequently become the object of their influence in all areas, including military affairs and security. In the nineties of the last century, Bosnia and Herzegovina was one of the first training grounds for conducting information and psychological operations, which were carried out by international forces, about which a handful of scientific and professional papers were written. Based on the analysis of those operations, manuals were created, which specifically state that they were created based on experiences in Bosnia and Herzegovina. For example, in the Manual of Psychological Operations of the United Stated of America Armed Forces it is stated: "NATO planners determined the need for a campaign aimed at the local population in BiH and designed to shape attitudes and behavior in favor of the IFOR (later SFOR's) forces and operations" (Department of Defense, 2003).

Such a diametrical balance of power in the information environment, despite relatively equal technical and technological capabilities, is primarily the result of significantly smaller investments by small states, compared to large ones, in all areas of human society, including in the development of military forces in accordance with modern scientific achievements. As a result, small states are lagging behind in the development of concepts, doctrinal documents, organization and development of the capabilities of forces for informational action. More significant progress in developing capabilities for informational action than the countries of the region was achieved only by Romania, "as one of the few NATO member countries that managed to professionally and professionally develop units for Psychological operations" (Miljković, 2019).

There is an abundance of literature on information and psychological operations conducted by the United States of America and NATO in Bosnia and Herzegovina, the former Federal Republic of Yugoslavia, Kosovo and Metohija, Iraq, Afghanistan, as well as a large number of strategic documents, doctrines and manuals in developed countries (most publicly available in the US), which include various aspects of information activities (strategic communications, information and psychological operations, cyber warfare and security, and others). On the other hand, less developed countries, which definitely include the Republic of of Serbia and its neighbors in the Balkans create their doctrinal documents and manuals for the most part in imitation of American ones, and in a large number of cases they are almost identical - that is, copied.

Regarding the organization of forces, the concepts are different and vary from country to country, both in the West and in the countries of the region. Similar to the doctrinal documents, the great powers have a well-developed and organized structure of commands, units and institutions that cover the field of information operations. In the armed forces of "small states" in the Balkan region, there are different experiences in the organization and functioning of forces for psychological and information operations, while strategic communications have not yet found an appropriate place in the national security and defense system of those countries.

As already pointed out, Western countries generally unite almost all areas of information action at the strategic level under "strategic communications", while the concept of "information operations" is responsible for the exclusively military area of action. "For the United States of America strategic communication, it is essential that communication planners consider national communication and strategic goals in the planning process, and that the actions of joint forces be coordinated with their partners in order to achieve unity of effort" (US Joint Chiefs of Staff, 2013). The United States of America Department of Defense, along with the Department of State, has a primary role in conducting strategic communications. Also, the Pentagon houses the Joint Staff with specialists for strategic communications.

Regarding information operations, which in the informational-perceptual aspect are mainly realized through psychological activities (operations) of the military forces, at the strategic, operational and tactical level, "in the Western armed forces, at the level of the General Staff and in intelligence commands, there are specialized bodies and centers from which they are managed by psychological operations centers, and are implemented by special units - battalions, companies and platoons for Psychological operations (Narula, 2004). The units are staffed by experts of various profiles (ethnologists, sociologists, psychologists, public relations experts, journalists, "new media" experts, satellite technology experts, etc.) and are equipped with the most modern technical means. In some armies, these forces are part of the command for special operations in the United States of America, Romania and Poland); in some they are within the Center for Civil-Military Cooperation in the Hungary, or under the jurisdiction of intelligence authorities in the United Kingdom (Miljković, 2019) and the importance of those forces in Western countries is indicated by the fact that "about 10,000 officers and soldiers are engaged in Psychological operations commands and units of the United States of America Armed Forces" (Miljković, 2019).

The small states of the region, as already pointed out, base their doctrinal documents, manuals, organization and training of forces largely on the example of American solutions. For example, "when talking about the construction of Croatian doctrinal documents for the execution of information and psychological operations, it should be pointed out that NATO documents in the field of strategic communication, information and psychological operations are directly implemented in Croatian military norms" (Miljković, 2019). From an organizational point of view, the department for special operations in the Croatian Armed Forces is part of the Operational Directorate of the Croatian Armed Forces and is responsible for planning, monitoring and carrying out information and psychological operations for all formations in the Croatian Armed Forces.

It is important to point out that, in addition to the tasks of Information and Psychological operations, that department is responsible for and takes care of the strategic communication support of the Croatian Ministry of Defence, as well as that the support for strategic communication in the Croatian Army is not based on the use of the Information and Psychological operations, but rather the intention is to make sure that experiences from those areas enable easier and more accurate communication with the domestic and foreign public (Miljković, 2019). This organization of information action is consistent with the concept of the United States of America, where the Operations Directorate of the United States of America Armed Forces provides expertise and advice in the field of information and psychological operations to the command structures of the United States of America Ministry of Defence in the process of strategic communication, with the aim of achieving national, strategic and military goals (Department of Defense, 2009).

However, what the Republic of Croatia lacks, as well as other countries in the Balkan region, is having a built-in capacity for informational action at the national level, such as, for example, in the United States of America, where the National Security Council is responsible for promoting strategic communication and responsible for ensuring that key messages and their impact are taken into account during Council decision-making (The White House, 2009). In terms of training and operational units, the first levels of information and psychological operations courses were launched in the Croatian Army in 2015, also according to NATO standards. In the coming period, it is expected that Psychological operations units of the Croatian Armed Forces will be equipped with specific equipment, as well as the formation of a special organizational structure, bearing in mind that Croatian doctrinal documents state that the full development of a psychological operations capabilities requires the establishment of a consistent organizational framework (Miljković, 2019).

The Republic of Serbia also still does not have a developed strategy, nor an institution responsible for strategic communications, but a smaller part of work in this area is carried out through the Directorate for Public Relations of the Ministry of Defense of the Republic of Serbia, the Department for Civil-Military Cooperation of the Ministry of Defense and the Security and Intelligence Sector. Unlike the Croatian Army, the Serbian Army still does not have a dedicated force for psychological activities and for activities in cyber space, although their formation and development of capabilities are foreseen in the Concept of Information Operations (Training Command of the General Staff of the Serbian Armed Forces, 2015). There is a similar and even more unregulated area of information activity in other countries in the Balkan region, and some of the basic challenges for their development will be described in the next chapter, with an emphasis on the information-perceptive aspect.

5. Challenges of developing the capacity of small states for informational action

The information-perceptive aspect is realized through activities in all areas of information activity (strategic communications, information operations and intelligence work), i.e. through: "public opinion management", diplomacy, activities related to public relations, then propaganda, deception, psychological and information operations , where the common feature of all the mentioned areas and activities is precisely the influence on the attitudes, will, emotions and cohesion of the enemy, which is why in Western literature they are often called "Influence operations" (North Atlantic Treaty Organization, 2007).

It is characteristic that all the mentioned areas and activities of information activities intertwine and interpenetrate, and often support and equalize. For example, strategic communications include diplomacy, public opinion management, public relations, propaganda, psychological and information operations, in order to influence the information district. Information operations are also carried out by psychological activities, "by which selected information is transmitted in order to create the desired impact on the consciousness, morale, thinking and emotions of the enemy and other domains in the operational environment" (Directorate for Intelligence and Reconnaissance Affairs (J-2) of the General Staff of the Serbian Armed Forces, 2012a). "Selected information" in practice is most often transmitted through institutions responsible for public relations, followed by diplomacy, intelligence work, propaganda, etc. Often, "selected information" can also be disinformation, with the aim of deceiving the enemy, manipulation on a rational level and achieving the desired influence. Deception, as one of the activities of information operations, is also realized by deception, which includes spreading disinformation, masking and simulations (Directorate for Intelligence and Reconnaissance Affairs (J-2) of the General Staff of the Serbian Armed Forces, 2012a).

Therefore, the first goal that should be fulfilled in order to achieve effective influence in the information environment is to organize, synchronize and integrate the work of all competent institutions and forces responsible for information-perceptive action as best as possible, in accordance with the principles: target selection, determination of center of gravity, grouping and economy of forces. The main challenges for the fulfillment of this goal in the context of small states are: 1) imprecise normative-doctrinal organization of information activities and 2) lack of adequate organizational and formation structure of forces and means for information activities.

Secondly, it is necessary to continuously develop and improve the capabilities of the forces for informational action in the modern environment, which in the informational-perceptive aspect are primarily based on knowledge and efficient use of available resources and means, which include: 1) detailed, comprehensive and high-quality analysis information environment, as well as analysis of the effect of information action - analytical abilities, 2) production of information that will achieve the desired effects (influence) - ability to produce information and 3) determination of the target group and method of distribution of information - ability to market information. In addition to the above, it is necessary to ensure the storage and protection of information, which is more in the competence of information and communication technology experts and is not part of the process of exerting influence, and therefore will not be discussed in more detail.

6. Analytical skills in the context of "Small States"

Understanding the operational environment is achieved through a systematic analysis of the connections and relationships of the various participants supported by appropriate information flows (Training Command of the General Staff of the Serbian Armed Forces, 2015). The winner in the information war should be the side that can produce and exploit information faster, that is, which analyzes, assesses the situation and reacts faster (Miljković, 2019).

Analytical abilities are necessary for the analysis of all areas of the information environment, as well as for the analysis of other dimensions of the operational environment (physical, military, temporal, political, social, economic, technological...), which makes them the most complex ability, and at the same time the most significant for efficient and effective information operation.

The analysis of the information environment includes the analysis of all of its three areas (physical, information and knowledge), as well as their mutual connections and relationships.

By analyzing the physical area of the information environment, the means and objects of information and communication technology of the enemy, friendly and own forces are determined, i.e. institutions, systems, human resources and technical means that enable the creation of effects related to information (written media, transmitters, information and communication systems, networks, etc.). Accordingly, for the analysis and understanding of the physical field, it is necessary to engage experts from the field of information and communication technology.

By analyzing the information area, which connects the physical and cognitive areas, all available and relevant information about the enemy that appears in the physical area are collected and analytically processed, in order to fully know and understand the enemy - the target group, i.e. its command system, process decision-making, desires, intentions, perception, awareness, understanding and belief. Therefore, the analysis of the physical and informational areas helps decision makers to correctly determine the goals, tasks, ways and forces for informational action, while at the same time it represents the starting point for the production and marketing of information that will most effectively exert the desired influence on the target group.

In order to perform a complete, comprehensive and precise analysis of the information environment, it is necessary to look at the wider context, that is, to analyze all dimensions of the operational environment, their mutual connections and relationships. For example, it is impossible to determine the correct goals and means of information action, as well as the characteristics of the cognitive area of the enemy - the target group, if the political, military, social, economic, physical and technological dimensions of the operational environment are not analyzed.

"Activities that take place in the operational environment almost always create effects in all three dimensions of the information environment." Precise determination of potential effects in all three dimensions is possible only if the information and operational environment as a whole are analyzed, understood and visualized. While even the most prepared personnel cannot anticipate all potential effects, understanding the operational environment enables personnel to respond appropriately to unplanned effects and determine why they occurred" (Ministry of Defense of the USA, 2018).

Uncertainty, complexity and variability are essential characteristics of the environment (Williams, 2010). Uncertainty can be defined as the impossibility to accurately and precisely predict all the changes that may occur in the environment. Complexity includes the number and degree of influence of all environmental factors. Variability as a characteristic of the environment represents the intensity with which changes occur in the environment. The degree of complexity of all factors from the environment which act makes that environment complex (Lukić, 2017). The more complex the strategic environment, the more scientific approach and less arbitrariness in its assessment is certainly necessary.

Analytical skills refer to the ability to process and analyze information, solve problems and make decisions. The analysis itself is, above all, a thought process that is almost entirely based on human judgment, reasoning and intuition. "Despite the development of technical support in modern analytical work there is still no substitute for the experience, judgment and intuition of the analyst" (Directorate for Intelligence and Reconnaissance Affairs (J-2) of the General Staff of the Armed Forces, 2012b).

The modern information environment is characterized by a lack of information and an oversaturation of information at the same time (Handel, 1989). Namely, as a rule, key data about the enemy is difficult to access and well protected, which is why, as with analytical skills, instead of relying on technical systems, their collection often requires the engagement of human resources in the field. A special challenge in the analysis of the information environment is its cognitive area, because it requires the collection and processing of intangible and difficult-to-verify information about the perception, attitudes and beliefs of the target group, that is, to get to the "heart, way of thinking and souls of people" (Miljković, 2019).

On the other hand, the main feature of the modern information age is the abundance of easily accessible information and data, which due to their quantity are increasingly difficult to collect, sort and process. "When considering the problem of oversaturation of information or the so-called ``noisy environment," according to most theorists, this phenomenon represents a bigger problem than the lack of information, because the greater the amount of information, the more confusing and contradictory data there is, which is then harder to process" (Miljković, 2019).

This practically means that the human mind is not able to process such a large amount of received information, which makes it suitable for manipulation. An additional problem is the information activity of the enemy, that is, their psychological-propaganda activity and deception, which is why the analysis of the information environment requires a detailed check of the accuracy and validity of all collected data. Analytical abilities thus gain increasing complexity, weight and importance, while the basic resource remains the same - the experience, knowledge, judgment, assessment and intuition of the analyst.

Analytical capabilities thus require a unified and coordinated process of collecting and processing data on the operational environment, with the engagement of experts from various fields, including information and communication technology experts, translators, linguists, psychologists, political scientists, sociologists, economists and others, as well as adequate guidance, training and the training of analysts, that is, the development of analytical skills required for the analysis of the information environment.

Small countries in the Balkan region, including R.of Serbia, possess significant analytical capabilities, i.e. analysts and analytical teams, responsible for various areas, both military (intelligence and security services, Public Relations Directorate...) and civilian sector (agencies and institutes, independent analysts, etc.). Accordingly, it can be said that analytical ability is achievable for small states and that significant material and financial allocations are not necessary for it. However, what is necessary is the aforementioned additional education and training to achieve this ability within the dedicated forces and composition for informational action, that is, their specialization and training for a certain area of informational-perceptual action.

7. Ability to produce information in the context of "Small States"

The production of information represents the central ability of information action, because it requires that, based on the analysis of the information environment, an information product is created that will create the desired effect in the knowledge area, in accordance with the proclaimed goals and interests of importance for defense and security. The production of information is, in principle, a continuation of the process of analyzing the environment, in accordance with the directions of the command and control authorities, the proclaimed tasks and goals of information activities.

Information products should be realistic, simple, with impressive content and designed to hit the values and cultural state of mind of the target group, causing a change in their behavior in the desired direction. Depending on the goal, the product can be information, message, clues, disinformation, propaganda material, etc., while the creators of the mentioned products can be specialists from various fields (sociologists, psychologists, writers, historians, military personnel and other categories).

An information product can generally be in the form of a text (magazine, press, flyer, book, publication, scientific work, internet blogs, posts, comments...), sound (speech, radio show, music track...), video (clip, advertisement, series, film ...), or a combination of the above. One of the types of information products is rumors, which can be untrue and half-true, and whose method of transmission is quite specific "from ear to ear", in "trust" or the innermost circle (Živojinović, 2016).

The production of information for information-perceptive action therefore requires the coordinated engagement of various experts and specialists, including specialists for technical support (printing, audio-video editing, etc.), and even actors, translators, proofreaders, and the like. In addition to the above, information products should be harmonized at the highest level, based on the goals that come from the policy, strategy and direction-orders received by the decision-makers, then have a realistic basis and impressive content, aligned with activities and procedures on the ground and on in the end, that their focus is on achieving the desired effects and outcomes.

The production of information must certainly be based on scientific foundations, principles and methods, and in accordance with modern scientific achievements and inventions in the field of information and communication technology. It requires an expert approach, innovation and creativity, but not technical-technological supremacy in the modern information environment. Influence through information is primarily based on the good knowledge of the essence and basic principles of media struggle, psychological effects and disinformation systems. In order for an information product to be effective in the modern information environment, it is enough for its creators to be, above all, inventive and imaginative people, endowed with great analytical ability.

It is clear that the ability to produce information is not closely related to military affairs, which is why it requires primarily civilian, not military, experts and experts (sociologists, psychologists, media experts...), which can represent a certain challenge, having considered that small countries, and especially their armed forces, generally do not have enough highly qualified experts in those fields. In addition to the above, this ability also requires certain specialized means of production, which are in short supply in the army, but widely distributed and easily available in specialized civilian institutions, and as we have seen in the modern information environment and beyond, i.e. "all around us".

On the basis of the above, it can be concluded that the ability to produce information is relatively easy to achieve for small countries, if the mentioned lack of personnel is removed, which requires certain smaller investments in employment, education and training of experts.

8. Ability to market and influence in the context of "Small States"

In the modern information environment, there are thousands of electronic, written, audio-visual and organizational media that can be used to disseminate information and influence. With the help of the Internet and satellite connection, it is possible to market information and propaganda content "from the inside" and in conditions where the media space of a certain country is closed from the influence of other media (Miljković, 2019) All human groups are potential organizational media, from families and small organizations, through advertising and public relations firms, unions, churches, theaters, various associations and groups, political parties and organizations, to state bodies of legislative and executive power, international coalitions and global organizations like the UN and their agencies. This diversity, on the one hand, facilitates the ability to market and influence, while on the other hand, it makes it difficult to choose those few media that are particularly significant and suitable for informational action in the appropriate context.

At the same time, the wide distribution and mass use of personal computers, mobile phones and the Internet have led to the "bombardment" of individuals with a huge amount of different information, as well as to the possibility of direct communication between people around the world. This type of communication and information overload has already resulted in the alienation of millions of people from real social life. Most people try, consciously or unconsciously, to cope with excessive information saturation by developing three defense mechanisms: selective attention, selective perception and selective memory. That is, they pay attention to a few media only; they selectively choose contents; and then, after a while, they suppress or forget those contents that they do not accept. Therefore, the marketing of information requires a detailed analysis of the enemy-target group and in terms of the specific media they prefer, that is, to which all websites, electronic or printed publications, television shows, leaders and role models in the world pay attention.

According to the Yale attitude change approach, it is defined that the action process of any informational message includes: placement, attracting the attention of the target group, understanding the message, retaining and finally changing behavior (Haugtvedt et al., 1992). Therefore, in addition to all of the above, in order to have the desired impact on the cognitive area of the target group, the information must reach that group and be sustainable over time, or be marketed over a longer period of time, which can be a challenge, especially in the conditions of possible information blockade of the "small country" by the "big powers".

However, as the Internet takes primacy and becomes an increasingly dominant tool for marketing all kinds of information, and therefore influence, it has become an independent and free social creation, accessible to all countries, as well as to the majority of the world's population. No one owns the Internet, but everyone owns a part of it. It is clear that large states - hegemons, and certainly more and more global organizations and corporations, own most of the hardware and software parts of the Internet, which somehow enables them to control, block or usurp a significant part of the global computer network. However, the development and expansion of the Internet certainly goes beyond corporate and national boundaries, and thus offers many alternative solutions in the case of attempts to control the flow of information, both in terms of Internet access itself, which is becoming more and more diverse (telephone, cable, wireless, satellite), and in to the issue of the internal flow of information, which is becoming more and more decentralized (servers, routers and Internet service providers). It can be concluded that there is almost no possibility of a complete blocking of Internet access, while the number of friendly and neutral countries that can provide Internet access is increasing.

The situation is similar with cable and satellite television and radio stations which can also be easily supported by friendly and neutral countries, in case of attempts to block them. The Internet also enables and is increasingly used to market television and radio content to global public opinion, as well as print media, which are therefore rapidly losing their role and importance in favor of electronic Internet editions.

On the other hand, the transmission of signals in the electromagnetic spectrum, through various types of radio and radio-relay devices, is more susceptible to interference in the case of technical-technological superiority of one of the parties to the conflict. However, the development of technology in this area also provides many alternative solutions, and their use is more effective at the operational and tactical level, i.e. in possible regional and local conflicts, in which there is currently no significant asymmetry of forces and means intended for informational action.

In general, it can be concluded that the ability to market and influence is fully attainable for "small states" in conditions of peace and the absence of information blockade or electronic jamming, while in conflicts it is available to a limited extent, especially in the area of satellite television and broadcasting signals in the electromagnetic spectrum. However, the expansive development of modern information and communication technology opens up more and more possibilities for alternative solutions, which is why it can be concluded that it is increasingly in favor of "small states".

9. Conclusion

Major trends affecting modern warfare, national security, and defense include an increasing amount and variety of information, available at an ever-increasing speed, through various information and communication technology means. This is precisely why military power is increasingly based on the possibility of possessing and monopolizing information, and armed conflicts are changing their physiognomy with the increasingly pronounced importance of competing parties in the information dimension of the operational environment.

At the same time, the massive spread and application of information and communication technology provides all actors in the conflict with various types of opportunities in the modern information environment, and in this way gives the chance to "small states" to achieve vital national and defense interests, locally, regionally, but also on a global level.
Information action, as the most general term, includes all activities related to information, which take place in all areas of the information environment, with the aim of influencing the decisions, attitudes, will, emotions, cohesion and behavior of enemies, allies and neutral public, in accordance with their own interests. In the framework of information activities, in principle, two separate types of activities

are distinguished: information-technical (physical and cyber-attacks in the information environment) and information-perceptive (acting on the cognitive area of the information environment), which are different, that is, they require different abilities, resources, methods and methods of action. In principle, the paper indicated only the possible direction of development of abilities for information-perceptive action, not diminishing the importance of the information-technical aspect, which certainly requires special research and analysis, with high expertise in the field of modern information and communication technology.

The information-perceptive aspect is also addressed because it acts on the central object of action in the information environment - the cognitive area, which does not require significant financial investments, as well as technical-technological superiority in relation to the opponent, but primarily a good organization and development of the capabilities of the forces, the most important of which are knowledge, expertise, creativity, desire and motivation.

However, the information-perceptive capabilities of "small states" are still inferior to those of "big powers", which is primarily a consequence of significantly smaller investments by "small states" in all areas of human society, including in the development of military forces in accordance with modern scientific achievements, which certainly includes the understanding, development and application of the concept of information-perceptual action.

The basic challenges of developing the ability of "small states" for information-perceptive action are based precisely on insufficient understanding of the essence of the modern concept of information-perceptive action, which requires a permanent structure, organization and engagement of all participants in the conflict - war (both military and civilian forces), on all levels, due to the increasing importance of the information environment in the context of modern warfare.

A specific challenge for "small states" is that information-perceptive action certainly requires particular organizational changes and investments, both in training and education, as well as in the opening of new training places, where the results and effects can be long-term, and some of them are also difficult to see, given that they are expected in the moral sphere of warfare.

The special importance of information activities for "small states" is that they can achieve important defense goals with such activities, such as deterring opponents from possible aggression. However, in order to achieve this goal, it is necessary for "small states" to carry out long-term, preventive and continuous information activities, and not only in the period of crisis, when it is obvious that aggression is likely to occur.

The first step in overcoming the aforementioned challenges would be to organize, regulate normatively and legally, synchronize and integrate the work of all institutions and forces of the state for information-perceptive action as precisely, rationally and efficiently as possible, in order to direct them in time and as effectively as possible towards the single goal on the way to the desired end state.

Secondly, it is necessary to continuously develop and improve the capabilities of forces for informational action in the modern environment, which in the informational-perceptive aspect are primarily based on knowledge and efficient use of widespread and easily accessible modern information and communication technology tools.

In order to achieve the stated goal in the system of national security and defense of R. of Serbia, it is necessary to elaborate and develop the national concept of information action in detail, and to refine existing and create new strategic-doctrinal documents, at all hierarchical levels (including national ones) and for all types of information action activities.

Then it is necessary to form, equip and train permanent forces and formations for all of the most important activities of information action, in the civil and military sectors, at the strategic, operational and tactical level (command structures, analytical and operational units, forces for technical support and asset development, formations for psychological and cyber activities, etc.). The forces for information-perceptive action must be integrated into a single entity at the national level and equipped with appropriate training resources, whereby the development of abilities can be achieved by making maximum use of the resources and opportunities of the modern information environment, then by systematic education and training of staff, and certain conceptual and organizational changes, without investing significant material and financial resources.

Literature

1. Archer, C. Bailes, A. Wivel, A. (2014). *Small States and International Security*. London.
2. Department of Defense (2003). Doctrine for Joint Psychological Operations. Joint Publication 3-53. JP 3-53. Doctrine for Joint Psychological Operations. Retrieved on 05 January 2021 from https://nsarchive2.gwu.edu/NSAEBB/NSAEBB177/02_psyop-jp-3-53.pdf.
3. Department of Defense (2009). Report on Strategic Communication. Washington. DC. page 8. Retrieved on 07 May 2021 from https://www.hsdl.org/?view&did=716396.
4. Directorate for Intelligence and Reconnaissance Affairs (J-2) of the General Staff of the Serbian Armed Forces (2012a). Doctrine of Information Operations of the Serbian Armed Forces. Media Center "Odbrana". Vojna štamparija. Belgrade.
5. Directorate for Intelligence and Reconnaissance Affairs (J-2) of the General Staff of the Serbian Armed Forces (2012b). The Intelligence doctrine of the Serbian Armed Forces. Belgrade.
6. Björkdahl, A. (2008). Norm advocacy: a small state strategy to influence the EU. *Journal of European Public Policy*, *15*(1), 135-154. page 150.
7. Friedman, T. (Day 11 May 11 1999) Steady as She Goes. *New York Times*. FOREIGN AFFAIRS. Retrieved on 05 December 2021 from https://archive.nytimes.com/www.nytimes.com/library/opinion/friedman/051199frie.html.
8. Haugtvedt, C. P. & Petty, R. E. (1992). Personality and persuasion: Need for cognition moderates the persistence and resistance of attitude changes. *Journal of Personality and Social Psychology*. *63*(2). 308–319. https://doi.org/10.1037/0022-3514.63.2.308.
9. Lopandić, D. (2010). Small and medium-sized countries in international relations and the EU. MP 1.
10. Lukić J. (2017). Environment and methods of analysis of the external environment in the process of strategic management. *HiT management*. Vol. 2(1): Belgrade.
11. Matić G. (2005). *At the mercy of angels*. Mediagraf. Belgrade.
12. Ministry of Defense of the USA (2018). Implementation of information operations in the Defense Forces of the USA. ATP 3-13.1.
13. Miljković M. (2010). Information warfare in contemporary military theory and practice. *Vojno delo.* Summer/2010.
14. Miljković M. (2019). Information operations and intelligence work. Media center. Belgrade
15. Narula Sunil (2004). Psychological operations (PSYOPs): A conceptual overview. *Strategic Analysis*. 28:1. 177-192. DOI: 10.1080/09700160408450124.
16. North Atlantic Treaty Organization (2007). Allied Joint Doctrine for Psychological Operations AJP-3.10.1(A). Retrieved on 05 September 2003 from https://info.publicintelligence.net/NATO-PSYOPS.pdf.
17. Putnik N. (2012). Cyber warfare – a new form of contemporary social conflicts. Belgrade.
18. Ramirez A. (1999). Heroes vs. Intruders and Terrorists. New York Times. March 29.
19. Reagan R. (1984) U.S. International Information Policy (NSC-NSDD-130**).** *Ronald Reagan Library*. Retrieved 02 December 2021 from https://irp.fas.org/offdocs/nsdd/nsdd-130.htm.
20. Stanković, Z. (2000). Connection of Western media and aggression. Novi Glasnik 5/2000. Belgrad
21. The White House (2009). National Framework for Strategic Communication. Washington. Retrieved 02 December 2021 from https://man.fas.org/eprint/pubdip.pdf **.**
22. Training Command of the General Staff of the Serbian Armed Forces (2015). The concept of Information operations of the Serbian Armed Forces. J 2-0. Media Center "Odbrana". Vojna štamparija. Belgrade.
23. US Joint Chiefs of Staff (2013). Commander’s Communication Synchronization. Joint Doctrine Note 2-13. Retrieved 10 December 2022 from http://www.dtic. mil/doctrine/notes/jdn2_13.pdf.
24. Harmon A. (Day 5 April 1999). War Waged on Web: Killers Without Context. *New York Times*. Retrieved 02 December 2021 from https://archive.nytimes.com/www.nytimes.com/library/world/europe/040599kosovo-internet.html
25. Van Eeten, M. J., & Mueller, M. (2013). Where is the governance in Internet governance?. *New media & society*, *15*(5), 720-736. page 2.
26. Vuletić D. (2004). Cruel of weapons. Military informator 4-5/2004. Belgrade.
27. Williams, C. (2010). Principles of management. Belgrade: Data status.

28. Živojinović M. (2016). Contradictions of the low-intensity conflict strategy and international law in the context of the conflict in SFRY. Doctoral dissertation. Belgrade.

Acknowledgement

This paper was written as a part of the scientific research project funded by the Ministry of Defence, Republic of Serbia, number: VA-DH/1/22-24 "Defence system capability development management model".

Review Scientific Paper/Pregledni naučni rad UDC/UDK: 005.8:004.42
Paper Submitted/Rad primljen: 11. 3. 2022.
Paper Accepted/Rad prihvaćen: 1. 7. 2022.
DOI: 10.5937/SJEM2202040A

Upravljanje projektom koristeći program JIRA

Aleksandar Arnautović[1]*

[1]TX Services d.o.o. Novi Beograd, Milutina Milankovica 1, aleksandararnautovic@icloud.com

Apstrakt: Rad se bavi analizom korišćenja programa Jira u upravljanju projektima, softverskim alatom koji možete koristiti da unapredite aktivnosti u upravljanju projektima. Rad će se odnositi na praktičnu primenu programa Jira u radu na projektu za Statistički panel švajcarskog portala Homegate.ch. Rad obuhvata ceo životni ciklus projekta, analize svih neophodnih delova koje je potrebno uraditi, njegovog deljenja u manje jedinice - priče, do završetka i predstavljanja klijentima. U Jiri, kao i u drugim softverima za upravljanje projektima, rukovodioci projekata i njihovi timovi mogu da vide spiskove zadataka koje treba obaviti, mogu da prave i dele analitičke izveštaje i da vide status svog projekta u stvarnom vremenu. Ovakva vrsta vidljivosti može da bude naročito korisna za timove koji koriste agilne metodologije.

Ključne reči: Jira, upravljanje projektima, projektni menadžment

Managing Project Using JIRA Software

Abstract: This paper deals with the analysis of the use of the Jira program in project management, a software tool that you can use to improve project management activities. The paper will refer to the practical application of the Jira program in the work on the project for the Dashboard Panel of the Swiss portal Homegate.ch. The paper includes the entire life cycle of the project, analysis of all the necessary parts that need to be done, its division into smaller units - stories, until completion and presentation to clients. In Jira, as in other project management software, project managers and their teams can view to-do lists, create and share analytical reports, and see the status of their project in real time. This kind of visibility can be especially useful for teams using agile methodologies.

Keywords: Jira, managing projects, project management

1. Introduction

This paper aims to determine how using Jira can help us in managing projects. It will provide an outline as to how its integration within existing teams, though perhaps complex and difficult to accept at the beginning, could increase productivity in the long-run, speed up project closure, give us a much better insight into productivity, work distribution, organization and a general idea of what everyone in the team is working on at any time. Finally, we will have a clear view of how to use Jira properly, how complicated it is to use it and what are the benefits of its use.

In this paper, we will try to answer some of the questions such as what is the role of management in managing projects (Biesenthal, 2018). We will discuss the project management in general and provide examples of how management can assist with that. We will also introduce Jira, a software that is very helpful for project management (Batselier, 2015). We will illustrate an example of a specific project for the Dashboard Panel of the Swiss portal Homegate, which we monitored from inception through completion 5 months later. Homegate Company deals with Internet real estate advertising for the Swiss market; it has 130 employees in 4 locations. It has 7 developer teams that need to be organized and managed. We will present a company project in which 6 Belgrade-based developers took part, how their work, tasks and meetings were organized, as well as how it was all displayed using Jira.

Atlassian Jira is one of the popular project management programs (Brown, 2007). Jira is a great example of a tool that was in the right place at the right time (AbouRizk, 2011). Fifteen years ago, there weren't that many tools on the market designed for teams employing agile methodologies, which is why this software has become a preferred product for teams following non-traditional workflows.

Lately, Jira has gained its supporters also outside the developer community. The best example is the famous comment by Jessica Alba, actress and Honest Company founder, in which she said that she didn't know how to code, but she knew how to open a ticket in Jira.

What to look for in a project management software

When choosing a project management software, consider some of the things listed below to find out what kind of project management tool you need:

- does it have a list of requests/ideas that need to be managed
- does it have the capability to track a larger team task by task
- does it have the ability to create visually interesting measurement parameters on a regular basis
- does it fit into the budget
- does it work in agile or a traditional methodology
- if it can follow every hour of work time
- does it have the ability for one person to be the manager in multiple teams on multiple projects (Ayhan, 2019)
- if the team can easily learn to work with new software (Agrawal, 2018)

When it comes to the project management software, you have many options. There exist advanced online solutions such as Asana. There are also simpler methods, such as Trello. But if you are looking for a powerful project management program that you can run on your own server, especially when it comes to software development, it is highly unlikely that you will find a better program than JIRA.

Atlassian's famous project management tool includes an array of features that make project management easy (Harold Kerzner, 2013). Although originally built for developers, it has evolved into a fantastic organization tool across the entire company (Aghimien, 2020).

Strengths of Jira Software

Jira offers benefits for co-located teams, as well as for distributed teams. With an efficient work environment and improved visibility into the project status, you can easily anticipate deadline issues. All the information needed by the entire team, including project milestones, updates and reminders, is available in one place.

Much of Jira's power lies in its customizable workflows, which offer you customizable transitions, validations and notifications to adjust your development process down to the smallest detail (Afolalu, 2021).

This efficient working environment uses REST services and Java application program interfaces, and more that 1300 plugins that enable enhanced functionality. You can connect Jira work item tracking feature to build and test Bitbucket and GitHub environments and perform searches for user and work item characteristics using Jira Query Language functions. In Jira, all data are kept in one place, which provides compliance control evidence and statistical analysis through customizable pre-defined charts and reports.

One of the most important factors in support of the viability of Jira project management program is that it was built respecting the principles of agile software development:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

Jira is suitable for agile software development projects for many reasons, including the ability to create Kanban and Scrum boards with capabilities to plan sprints and estimate time required to solve a work item. Users often recommend easy-to-create burndown charts, as well as cumulative flow diagrams. You can also use workflows that do not require configuration or customize boards in Jira tailored to your own needs. Additionally, you can customize fields and screens used to record and track work items.

In agile methods, *backlog* (a list of initial requirements) represents a series of tasks that need to be done to complete the project, thus replacing longer formal documents in which the requirements are stated.

Backlog items are short and can be written from a technical perspective or from a user perspective (like user stories). The organization of this list is called *backlog refinement.* In Jira, the ability to drag and drop items across the screen makes organizing backlog easy, and you can also apply filters to display key issues and attributes.

Dashboards in Jira allow team members and stakeholders to view updated information about the project status. With field-level security settings, you can share a dashboard while controlling who sees its content. Use Jira's mobile app for Android and iOS to track and update work items on the fly and collaborate with colleagues using HipChat feature. An enterprise-level view is also possible in Jira with the help of Portfolio Management add-on, which allows you to see the bigger picture when it comes to project tasks and resources.

The good thing about using Jira for project management is that it integrates easily with multiple enterprise platforms. In addition, Jira replaces four or five other standalone products, making it suitable for large organizations consisting of multiple levels and interconnected parts.

It is a great tool that allows you to have control over multiple teams working on multiple projects (Aziz, 2014). It is also excellent when it comes to transparency – each hour can be carefully tracked and represented in easy-to-understand visual charts.

Who is Jira intended for?

Power and flexibility of Jira make it a great option not only for software development teams, but also for a variety of roles in technological and other companies, such as financial firms, and even small businesses. For instance, the ability to track work items in Jira allows editorial teams to assign tasks to writers and graphic designers from the same project, offering managers and senior officers' visibility into the work status.

Jira and project management plugins

With plugins, you can extend the capabilities of Jira. Plugins offer a variety of functions, including tables, the ability to see who else is viewing the same work item as you, and the ability to create a list of work items in an external editor, with Jira creating a task for each. Some plugins are free, while many are available from the Atlassian Marketplace.

Although the original purpose of Jira was to track bugs and work items, you can use plugins to expand its functionality to a range of other business roles:

- Marketing: the capability of a single source means that you can send different requests and materials to different team members within the same project (Bardhan, 2007).
- Compliance: Workflows and data archiving provide an audit trail for organizations with their own regulations.
- Remote work: deadlines, notes, workflows and more are available in one central cloud hub.
- Mobile development: use one project with split components for each variation.
- Product management: Jira increases customer satisfaction by opening a dialogue between development teams and users, allowing users to report bugs and make suggestions.
- DevOPs: customizable screens, charts and reports in Jira, as well as dashboards allow for an up-to-date monitoring of work status.
- Support: Jira can be like your information portal where users can submit their tickets and get updated solutions.

Despite the way in which plugins increase versatility of Jira's functions, tailoring Jira to individual needs can be tedious. The strength, but also a weakness, of Jira is that it remains a specialized task, issue and project tracking software. If you want capabilities beyond that, you will need to use add-ons from the Atlassian Marketplace or purchase an additional tool. You will spend a significant amount of time trying to configure a solution that will suit your needs. For instance, if you wish to use Jira Software as an ALM platform, you will probably need to add a plugin for Confluence, HipChat and Portfolio Management.

What is a Jira project?

In Jira, a project consists of work items. These can include anything you track in the program itself, such as support tickets, product bugs or product development work tasks. Work items must belong to a project and cannot be independent. A project has a name and a key. For instance, if the project is called *MyHomegate*, the key is *MYH*. The key then forms part of the keys of the individual work tasks in the project (e.g., MYH-100, MYH-101).

Projects in Jira also have other features. For example, Jira projects often contain similar work items. Each project has a unique versioning system, and for each project unique user permissions can be specified.

To understand the rest of the internal structure of Jira, imagine that all work on the platform is organized around four hierarchical stages (Arrow, 1974):

- Project categories: the first level, which represents the all-embracing project concepts and how the work on projects relates to other projects.
- Projects: this level includes components and versions of projects, which can also be considered project milestones.
- Work items: also called work tasks in agile methods, they help to meet the requirements of user stories. They can be sorted by item types.
- Subtasks: this feature allows you to break complex work items into smaller manageable units.

Jira project management best practices

Given it is an evolving platform; Jira has amassed numerous best practices over time. Here are some of them, grouped by categories:

Setting up a project:

- When starting a project, choose a classic template from Jira in order to eliminate out-of-the-box schemes that may later limit the functionality of the project. Jira Classic uses basic schemes that you can customize to fit your needs.
- You can prioritize all work tasks so that the team knows which tasks need to be tackled immediately and add due dates to work items so those working on them can prioritize their tasks.
- Remember that you can gain additional organizational capabilities by linking any two working items. This will help you overcome the problem of how to deal with subtasks that require multiple sprints to complete.

Roles:

- It pays to appoint multiple team members as Jira administrators, as well as agile development board administrators and Confluence administrators. In this way, all functionalities will be accessible even when a team member is absent.
- In your projects, always include the Jira administrators group in the administrator role. In this way, the administrator will be able to assist with unexpected problems or feature changes.
- Make sure that all Jira users with access to your project understand the capabilities of their role and how they can improve your configuration (Krane, 2010).

Communication:

- Encourage your team to add profile pictures in Jira. Pictures can be especially helpful for teams that do not work side-by-side.
- Every Jira project has a Confluence space. Use it to discuss general questions about your team and project, and then link that discussion to other content for an even more in-depth discussion.
- Consider Kanban and Scrum boards in Jira for reporting, in addition to dashboards, pre-scheduled emailed reports and written documents for Confluence (Kaiafa, 2015).
- By using "@[user]" in the description or comments field of a work item, you can notify Jira users about your teams' regular communication and discussions about work items.
- To prompt users to carry out an activity, such as adding a comment or recording time, set up transition screens in your workflow.
- Mark completed work items as done so that the story can be forwarded to future sprints.
- Regularly remove users who no longer need access to Jira and redistribute work items. Administrators can remove them from all permissions, delete user names from groups and deactivate their accounts.

Workflows:

Workflows show the movement of work items through the Jira system. They offer you flexibility by customizing workflow schemes and conditions, validators, post functions and other workflow properties. You can get the most out of workflows by ensuring that they are simplified, fit the needs of your project, and that final workflow diagram that users will refer to is clean and efficient.

It is recommended that you use the analytics tool from the start and often thereafter. Analytics tools can help developers communicate, as well as help you track your employees, even across multiple projects (Denicol, 2020).

It is further recommended that the backlog be always updated and well organized. You need to think carefully about what metrics will be most useful to you and the project stakeholders, and then organize your project to collect such data (Eweje, 2012).

Workflows in Jira

In Jira, working process is used to track the lifecycle of an issue. Workflow is a record of statuses and transitions of an issue during its lifecycle. A status represents the stage of an issue at a certain point. An issue can be in only one status at a given point in time such as Opened, To Do, Done, Closed, Assigned, etc.

A transition is a link between two statuses when an issue moves from one status to another. For an issue to move between two statuses, a transition must exist. In simple terms, a transition is some kind of work done on that issue, while status is the impact of work on that issue.

For instance, an issue is created and opened. When the assignee starts working on the issue, the issue is moved to **In progress** status. Here, the transition is initiating the work, while the status is now progressive.

JIRA working process has the following stages for tracking as soon as an issue is created:

- **Open**: After creation, the issue is open and can be assigned to the user to start working on it.
- **In progress**: The user has actively started working on the issue.
- **Resolved:** All subtasks and works of that issue have been completed. Now, the issue is waiting to be verified. If the verification is successful, it will be closed or reopened, if further changes are required.
- **Reopened**: This issue was resolved before, but the solution was either incorrect or missed a few things or needed some changes. After reopening, issues are marked as either assigned or resolved.
- **Closed**: The issue is considered closed, the solution is now correct. Closed issues can be reopened later based on request.

Conclusion

Jira is a great example of a tool that was in the right place at the right time. Fifteen years ago, there weren't that many tools on the market designed for teams employing agile methodologies, which is why this software has become a preferred product for teams following non-traditional workflows, which are not like Waterfall model (Akanmu, 2015). The good thing about using Jira for project management is that it integrates easily with multiple enterprise platforms (Gaur, 2022). In addition, Jira replaces four or five other standalone products, making it suitable for large organizations consisting of multiple levels and interconnected parts. It is a great tool that allows you to have control over multiple teams working on multiple projects (Flyvbjerg, 2011). It is also excellent when it comes to transparency – each hour can be carefully tracked and represented in easy-to-understand visual charts. The strength, but also a weakness of Jira is that it remains a specialized task, issue and project tracking software. If you want capabilities beyond that, you will need to use add-ons from the Atlassian Marketplace or purchase an additional tool.

At the very start of the project, the team was not familiar with Scrum methods, initially opposing their use in the project (Boland, 2007). They did not read any books or tutorials about the matter and did not feel bad about it. However, as the project progressed, they managed to integrate the Scrum methodology piece by piece into their daily work, and in the end the customer was very satisfied with their work. They are not burdened with inspections and rules, hence they view project differently from the project manager. This is why discussions lead to very good solutions. A lot of good has come from the fact that both we and the developers are thinking in a new way. We began to value individuals and interactions more than processes and tools.

Although the team can learn a lot from reading up on development methods, it can be concluded that the team knows how to build a software, that its members are very flexible and they do well in customizing the method to the customer. Since the goal of the Scrum method is to make the customer happy, the team is already doing well.

The conversations the author had with developers indicate that they think the development method they are using is a step up with respect to the previous experience. This is why it is easy to believe they will share their positive experience with friends and colleagues and gladly use similar methods in the future. Perhaps this is the reason behind agile development methods' popularity.

Bearing in mind the situation the team was in when they adopted the Scrum method; it can be said they did a good job. Surely, with the leadership of the Scrum masters, they would have achieved a different result, which might have even been better, but general impression is that the team achieves results and that the customers are getting what they want. Given that this is the goal of any development method, we cannot criticize them.

Can they do any better? It is for sure that they will. They are constantly improving the method and learning from each other and from their colleagues.

Literature

1. AbouRizk S., Halpin D., Mohamed Y., Hermann U. (2011). Research in modeling and simulation for improving construction engineering operations. *Journal of Construction Engineering and Management*, 137(10), 843–852. https://doi.org/10.1061/(ASCE)CO.1943-7862.0000288
2. Afolalu S. A., Ikumapayi O. M., Abdulkareem A., Soetan S. B., Emetere M. E., Ongbali S. O. (2021). Enviable roles of manufacturing processes in sustainable fourth industrial revolution: A case study of mechatronics. *Materials Today: Proceedings*, 44(1), 2895–2901. https://doi.org/10.1016/j.matpr.2021.01.099
3. Aghimien D., Aigbavboa C., Oke A., Thwala W., Moripe P. (2020). Digitalization of construction organisations—A case for digital partnering. *International Journal of Construction Management*, 1–10. https://doi.org/10.1080/15623599.2020.1745134
4. Agrawal A., Gans J., Goldfarb A. (2018). *Prediction machines: The simple economics of artificial intelligence*. Harvard Business Review Press.
5. Akanmu A., Anumba C. J. (2015). Cyber-physical systems integration of building information models and the physical construction. *Engineering, Construction and Architectural Management*, 22(5), 516–535. https://doi.org/10.1108/ECAM-07-2014-0097

6. Arrow K. J. (1974). *The limits of organization*. W. W. Norton & Company.
7. Ayhan B. U., Tokdemir O. B. (2019). Safety assessment in megaprojects using artificial intelligence. *Safety Science*, 118, 273–287. https://doi.org/10.1016/j.ssci.2019.05.027
8. Aziz R. F., Hafez S. M., Abuel-Magd Y. R. (2014). Smart optimization for mega construction projects using artificial intelligence. *Alexandria Engineering Journal*, 53(3), 591–606. https://doi.org/10.1016/j.aej.2014.05.003
9. Bardhan I. R., Krishnan V. V., Lin S. (2007). Project performance and the enabling role of information technology: An exploratory study on the role of alignment. *Manufacturing & Service Operations Management*, 9(4), 579–595. https://doi.org/10.1287/msom.1070.0163
10. Batselier J., Vanhoucke M. (2015). Evaluation of deterministic state-of-the-art forecasting approaches for project duration based on earned value management. *International Journal of Project Management*, 33(7), 1588–1596.
11. Biesenthal C., Clegg S., Mahalingam A., Sankaran S. (2018). Applying institutional theories to managing megaprojects. *International Journal of Project Management*, 36(1), 43–54. https://doi.org/10.1016/j.ijproman.2017.06.006
12. Boland R. J., Lyytinen K., Yoo Y. (2007). Wakes of innovation in project networks: The case of digital 3-D representations in architecture, engineering, and construction. *Organization Science*, 18(4), 631–647. https://doi.org/10.1287/orsc.1070.0304
13. Denicol J., Davies A., Krystallis I. (2020). What are the causes and cures of poor megaproject performance? A systematic literature review and research agenda. *Project Management Journal*, 51(3), 328–345. https://doi.org/10.1177/8756972819896113
14. Eweje J., Turner R., Müller R. (2012). Maximizing strategic value from megaprojects: The influence of information-feed on decision-making by the project manager. *International Journal of Project Management*, 30(6), 639–651.
15. Flyvbjerg B. (2011). Over budget, over time, over and over again: Managing major projects. In Morris P. W. G., Pinto J., Söderlund J. (Eds.), *Oxford handbook of project management* (pp. 321–344). Oxford University Press. https://doi.org/10.1093/OXFORDHB/9780199563142.003.0014
16. Gaur S., Tawalare A. (2022). Investigating the role of BIM in stakeholder management: Evidence from a metro-rail project. *Journal of Management in Engineering*, 38(1). https://doi.org/10.1061/(ASCE)ME.1943-5479.0000979
17. Harold Kerzner, (2013). Project Management: Project Management: A Systems Approach to Planning, Scheduling, and Controlling. Wiley
18. James T. Brown, (2007). The Handbook of Program Management: How to Facilitate Project Success with Optimal Program Management, Second Edition. McGraw-Hill
19. Kaiafa S., Chassiakos A. P. (2015). A genetic algorithm for optimal resource-driven project scheduling. *Procedia Engineering*, 123, 260–267. https://doi.org/10.1016/j.proeng.2015.10.087
20. Krane H. P., Rolstadås A., Olsson N. O. E. (2010). Categorizing risks in seven large projects—Which risks do the projects focus on? *Project Management Journal*, 41(1), 81–86. https://doi.org/10.1002/pmj.20154

Original Scientific Paper/Originalni naučni rad UDC/UDK: 355.4:005.51(497.11)
Paper Submitted/Rad primljen: 12. 5. 2022.
Paper Accepted/Rad prihvaćen: 1. 7. 2022.
DOI: 10.5937/SJEM2202047I

Savremeni izazovi za sistem odbrane Republike Srbije

Tatjana Ilić-Kosanović[1*], Damir Ilić[1]

[1]Univerzitet „Union-Nikola Tesla“, Fakultet za inženjerski menadžment, Bulevar vojvode Mišića 43, tatjana.ikosanovic@fim.rs
[1]Univerzitet „Union-Nikola Tesla“, Fakultet za inženjerski menadžment, Bulevar vojvode Mišića 43, damir.ilic@fim.rs

Apstrakt: Pitanje razvoja sistema odbrane predstavlja veliki izazov za kreatore strategija u zemljama različitog ekonomskog, tehnološkog, društvenog i političkog razvoja, kao i za akademske i profesionalne istraživače, kao i pojedince koji te strategije sprovode. Izazovi koji su pred njima, prisutniji su nego ranije, jer, pored političkih pitanja, mnoge kategorije utiču na razvoj strategije nacionalne bezbednosti i odbrambenih strategija, kao što su nove tehnologije, ekonomske krize, politički uticaj i društvene promene. Ovaj rad istražuje aktuelnu literaturu o razvoju strategija nacionalne bezbednosti i strategija odbrane i najznačajnijim izazovima koji mogu da utiču na razvoj strategije nacionalne bezbednosti i strategije odbrane Republike Srbije. U drugom delu, na osnovu prepoznatih izazova, razmatraju se oni najvažniji u formi intervjua sa stručnjacima i akademicima iz oblasti odbrane i nacionalne bezbednosti, visokoškolskim nastavnicima strategijskog menadžmenta i profesionalcima iz oblasti odbrane, bezbednosti i informacionih tehnologija.

U radu se zaključuje da su izazovi širokog spektra i različitog nivoa značaja. Ipak, najvažniji izazovi politike i procedure upravljanja rizikom; demografija (ljudski resursi) i obrazovanje; sajber rat, sajber kriminal i sajber terorizam; ekonomske krize i budžeti za odbranu; javno zdravlje i globalne zdravstvene krize; kao i klimatske promene. Pored toga, takođe, sagovornici su izdvojili ulaganje u obrazovanje ljudskih resursa koji bi bili sposobni da razvijaju strategije nacionalne bezbednostt i odbrane.

Ključne reči: Savremeni izazovi, sistem odbrane, Republika Srbija, nove tehnologije, ljudski resursi.

Contemporary Challenges for Defence System of the Republic of Serbia

Abstract: The issue of development of defence systems gives a hard time to strategy developers in the countries with various level of economic, technological, social, and political development, same as to the academic and professional researchers and the individuals who implement those strategies. The challenges in front of them are more present than before, as besides political issues, many categories are influencing national security strategies' and defence strategies' development, such as technology development, economic crises, political influence, and social changes.

This paper researches current literature on national security and defence strategies development and the most significant challenges that influence the development of national security strategy and defence strategy of the Republic of Serbia. In the second part, based on acknowledged challenges, the most important ones are discussed in the form of interviews with defence and security experts and academics, strategic management higher education teachers and the professionals in the field of defence, security, and information technologies.

The paper concludes that the challenges are wide-ranging and are of various levels of significance. Nevertheless, the most important challenges that emerged are: demography (human resources) and education; risk management policies and procedures; cyber war, cybercrime, and cyber terrorism; economic crises and defence budgets; public health and global health crises; and climate change.
Moreover, the interviewees singled out as the crucial category: the investment in education of human resources that would be capable of developing national security and defence strategies.

Key Words: Contemporary challenges, Defence System, Republic of Serbia, new technologies, human resources.

Introduction

During the first two decades of the 21st century, defence systems of various countries have been facing same challenges that would shape future defence strategies. Defence systems have to adapt to a variety of emerging changes in technology, global economy, social environment and new risks like ongoing global health crisis that shaped last three years.

Various studies identified key challenges as fast technological development, economic crises, social changes and the necessity for new approaches and commitment to risk management (Layton, 2015; Knezović, Cvrtila, Vučinović, 2017). In the first part, from in depth analysis of the international literature this paper aims to single out the challenges for the national security and defence that are important for the defence system of the Republic of Serbia. In the second part, the most important challenges are accentuated with the analysis of the interviews with defence and security experts, higher education teachers and researches in the field of defence, security and strategic management, and the professionals in the field of information technologies.

The most important aspects that are going to be analysed are: risk management policies and procedures; cyber war, cybercrime, and cyber terrorism; economic crises and defence budgets; public health and global health crises; demography (human resources) and education; and climate change.

1. Literature review on the defence systems' challenges

In regard of national security and defence, today's countries and societies are facing considerably higher number of threats, difficulties, and other issues that should be taken into the account in creating and implementing national security ad national defence strategies. Multi-polarity of the modern world brought up the need for much broader approach to building national security and defence strategies, than focusing solely on military strategies and military preparedness (Dinicu, 2020).

1.1. Public health and health global crises

The onset of Covid 19 pandemic that lasts for more than two years started to emphasise the importance of public health strategies for coping with epidemics and pandemics alike (Dinicu, 2020). Even though the world at the beginning of the 21st century saw several epidemics (SARS, MERS, and Zika virus), it seems that the onset of the first pandemics since the Spanish flu in 1918 caught the world by surprise (various world organizations, countries, societies, health experts, and the general public alike).

Not only the global health crises may influence national security strategies development, but the issues as sedentary lifestyle, inadequate diet, and stress may influence the health of a population in a way that can disrupt business processes and defence capabilities (Nang, Martin, 2017).

1.2. Risk management policies and procedures

Covid 19 pandemic also revealed that preparedness for eventual major events (epidemics, wide range forest fires, floods, earthquakes, etc.) and development of timely numerous strategies by the proper authorities is of the utmost importance (Layton, 2015). Many authors agree with Heide (2022) that the "risk management techniques, such as screening, profiling, or precautionary measures, have increasingly determined security practices". Risk management is extremely important in preserving energy security (Mara, Nate, Stavytskyy, Kharlamova, 2022) which is currently becoming more obvious with the onset of armed conflict between Russia and Ukraine.

1.3. Information technologies

One of the main issues for development of a national security strategy and defence strategy is the question of emerging technologies and their influence on different states and societies (Kononov, Zhukov, 2020). Regarding new technologies, key points are IoT, crypto currencies, cloud computing, etc. that can enable accelerated development of business and innovations (Pătrașcu, 2021). However, implementation of new technologies brings new, unprecedented threats like cyber attacks.

Cyber security and cyber attacks

Cyber space is becoming one of the most important elements of business processes in various industries. Regulating the cyber space includes issues that include privacy, interests of national security, governments, non-governmental organizations, and private companies (Greiman, 2016; Kovács, 2018; Овчиников, 2020). With the widespread usage of cyber space, the danger of cyber-attacks increases significantly, as a new, "untraditional" type of threats. Not only the cyber-attacks on critical infrastructure, but attacks on companies, transport, financial markets, educational institutions, health centres and hospitals, and other institutions are the threatening factors for the security of a country or a society (Carr, 2016; Gnatyuk, Gnatyuk, Kononovich, Kononovich, 2016; Nacita, Reith, 2018; Bobric, 2021).

Cyber war

Development of information technologies enables real life war, led in physical space, to be transferred to cyber space. The Republic of Serbia (then a part Federal Republic of Yugoslavia) was a part of one of the first conflicts that had some cyber war elements in which the hackers from Serbia, Russia, and China took part on one side and the hackers from NATO countries and Albania were on the other (Denning, 2001).

Cyber terrorism

Similarly, the threats of cyber terrorism are arising, where terrorist groups are trying to spread fear between citizens of attacked cities, towns, and countries. Cyber terrorism can be defined as "the convergence of terrorism and cyberspace" (Denning, 2001).

1.4. Economic crises and defence budgets

Defence budgets are becoming more significant in times of perceived danger of military attack and the popular support for increasing those budgets surges in times of real or perceived threat as it is a case of Lithuania or Estonia (Gečienė-Janulionė, 2018; Veebel, Ploom, 2018). They are often influenced by economic crises and the necessity to balance the financial capabilities of a state and military requests.

1.5. Social disturbances

Religious fundamentalism

One of the threats for the security of countries and societies is the rise of religious fundamentalism, especially in multi-religious countries with the emphasis on Islamic fundamentalism, with the emergence of inter-religious dissimilarities, disagreements, and disputes (Shia vs. Sunni Islam; Russian vs. Ukrainian orthodoxy, etc.) (Corradi, 2016).

Illegal immigration

Political and social instability in the Middle East, Africa, Afghanistan and other countries, especially a conflict in Syria, brought numerous waves of illegal immigration to Europe, with the Balkan countries as a primary route to Western Europe (Estevens, 2018). This problem is of an essence for creating national security strategies of the countries in the Balkans, but also European Union countries.

1.6. Demography, human resources, and education

There are two areas of importance concerning demographic landscape of a country, one is the number of citizens in a country and the other a quality of human resources that supports not only the development of national security strategy and defence strategy, but have the capacity to implement those strategies (Obreja, Ștefan, Metea, 2018). One of the crucial problems for the countries with the social and economic background similar to Serbia is so called brain drain - emigration of the educated, knowledgeable, skilled, and motivated workforce (Obreja, Ștefan, Metea, 2018). In addition, the quality of human resources increases innovations, businesses development, same as economic and social wellbeing of a society.

Many authors state that the reform of education system is needed in order to develop particular traits in younger generations that would accommodate national security and defence strategies, with problems arising in clash of conservative and modernist educational approaches like in Russia (Kislyakov, 2018). US Department of Defence creates strategies in investing in STEM (Science, Technology, Engineering and Mathematics) programs for the students to “inspire, cultivate, and develop exceptional STEM talent through a continuum of opportunities to enrich our current and future DoD workforce poised to tackle evolving defence technological challenges” (DoD, 2021).

1.7. Climate change

Climate change is very important issue for the development of national defence strategies because it presents a “complex suite of interrelated risks that can be disaggregated to food security, water security, energy security, human security and political instability” (Farbotko, 2018). The consequences of rising sea levels, temperature change may bring catastrophic events like major floods, fires, and extreme weather conditions that can affect, for example, water supply (Dalgaard, 2017). Climate policies should be included in national security strategies and national defence strategies (White, 2020).

2. Research

The scope of study and data collection

Methodology and methods

For this study, 20 defence and security experts, higher education teachers and researches in the field of defence, security, and strategic management, together with the professionals in the field of information technologies were contacted for the interviewes. Five potential interviewees declined the participation due to illness or other engagements.

The purpose of the empirical part is to develop a list of the most important challenges for the national securitz and defence strategies development for the Republic of Serbia. The interviewees were conversed with in the period of January 17, to 21, 2022 through unstructured in person interviews with the answers recorded by the authors.

Description of the sample

For the purpose of this research, fifteen participants were interviewed. Demographical information of the sample is presented at Table 1.

Table 1. Demographic variables (Source: author)

Code Name	Field	Expertise	Position	Gender	Age
P1	Management	Strategic management	Full professor	M	44
P2	Security	Risk management	Risk manager	M	42
P3	Defence	Strategy development	Associate professor	F	57
P4	Information technologies	Cyber security	Consultant	M	41
P5	Defence	Strategy development	Full professor	M	58
P6	Information technologies	Technology development	Associate professor	F	46
P7	Security	Strategy development	Full professor	M	56
P8	Management	Human resources management	Associate professor	F	51
P9	Defence	Strategy development	Associate professor	F	58
P10	Security	Risk management	CEO	M	48
P11	Information technologies	Strategy development	Consultant	M	40
P12	Information technologies	Technology development	Manager	M	44
P13	Management	Strategic management	Researcher	M	51
P14	Security	Cyber security	Manager	M	51
P15	Defence	Strategy development	Researcher	M	38

Table 1. shows that eleven participants were male and four female. Nine participants were members of academic community (seven professors in various rank and two researchers), and six were from professional community in the fields of security, information technologies, and risk management.

Survey design

The interviewees were given a list (Table 1) of the most important challenges for the development of defence systems acquired from the researched literature and had the opportunity to express their views on the importance and the influence of those challenges on the development of the strategic defence system of the Republic of Serbia.

Table 1. The list of challenges to the defence systems' development presented to the participants (Source: author)

The List of Challenges
Risk management policies and procedures
Economic crises
Demography (human resources)
Education
Cyber war
Cybercrime
Cyber terrorism
Religious fundamentalism
Public health and health global crises
Climate change
Defence budgets
Illegal immigration

4. Results

The participants in the first part of the interview were presented the list of observed challenges with the task of creating the rank for the recorded challenges. Based on their ranking of the challenges, a final list of challenges is created based on the precedency (Table 2).

Table 2. The list of challenges to the development of the defence system of the Republic of Serbia presented by the priority (Source: author)

Rank	The List of Challenges by Priority
1.	Human resources
2.	Education
3.	Demography
4.	Risk management policies and procedures
5.	Cyber war (attacks) and Cybercrime
6.	Public health and global health crises
7.	Cyber terrorism
8.	Climate change
9.	Religious fundamentalism and illegal immigration
10.	Economic crises and defence budget

The interviewees agreed that the demographic issues (like emigration and aging of population) should be treated as a separate challenge from human resources (in terms of knowledge, skills, abilities and motivation for continuous learning and career development and drive for achievement, which would be beneficial for development and implementation of national security and defence strategy).

Participants P1, P3, P7, P9, P13 and P14 emphasised that in times when demographic landscape is changing, with aging population and emigration, the keys of social, economic, and technological development are the existent human resources and building knowledge, skills, and abilities through lifelong learning. Only educated population can be able to develop, implement, and promote national security and defence strategies that can be beneficial for a state and the society as a whole. Participants P3 and P9 stated that the Republic of Serbia in 2020 adopted national security strategy and national defence strategy that are taking into the account the human resources as a key element of strategies' development and implementation (Република Србија, 2020; Република Србија 2020a). Participants P4, P10, P11, and P12 stated that it is necessary to develop new talent capable to tackle cyber attacks and develop cyber defence strategies for the state, military, government institutions, businesses, hospitals, and educational institutions. P2 and P10 accentuated the need to develop more risk managers for government institutions, local authorities, military, police, businesses, etc, in order to be proactive in case of major unwanted events (epidemics, floods, earthquakes, conflicts, etc.). Participant P1 emphasised development of human capital that would be able to develop strategies for coping with climate change (engineers from programs like environmental protection, environmental management, waste management, etc.). Participants P1, P10, and P11 also emphasised further development of programs that are including supply chain management as a crucial factor in various unwanted events (conflicts, floods, earthquakes, etc.). Participant P8 stated that the human resources development should be a crucial point of any strategy development, because without the people there are no results, the participant especially emphasised development of capabilities of all individuals in a country or a business, not only the development of talent.

Also, participants stated the importance of focusing on building educational system based on both STEM and social sciences that would be beneficial for future policy creators and implementations alike which would attract both female (especially in STEM) and male students, and the students from the various regions.

Participant P14 emphasised the necessity for adoption of digital defence strategies. Participant P14 also emphasised the need for creating cyber-security strategies that are becoming of outmost importance for any country, including the Republic of Serbia.

5. Discussion

There is a difference in cultural approach to education of future generations in terms of awareness of national security and defence, as some Russian approach is rather conservative and focuses on rebuilding “old” values (Kislyakov, 2018), United States clearly emphasises science and innovation as keys to future national security and national defence (DoD, 2021).

One of the solutions for developing a proactive approach to possible threats is structuring so-called resilience of companies, states and societies - the ability on facing a variety of predictable and unpredictable threats and hazards (Dalgaard, 2017).

One of the focal points from both existing strategies, research and interviewees is the necessity for creating digital defence strategies (MoD, 2022).

6. Limitations and scope of further research

This research is limited by the methodology and the sample, additional studies should include in depth examination of the most significant challenges for the development of the defence system of the Republic of Serbia, and implementation of robust statistical analysis.

7. Conclusion

Besides political issues, many categories are influencing national security strategies’ and defence strategies’ development, such as risk management policies and procedures; cyber war, cybercrime, and cyber terrorism; economic crises and defence budgets; public health and global health crises; demography (human resources) and education; and climate change.

Based on acknowledged challenges, the most important ones are discussed in the form of interviews with defence and security experts and academics, strategic management higher education teachers and the professionals in the field of defence, security, and information technologies. They emphasised the most important category for development of national security and national defence strategies, mainly the human resources that develop policies and procedures, build and implement cyber defence systems, create and implement military budgets. The investment in education of current and future generations is the key for building educated workforce, professionals and experts who will be able with their knowledge, skills, and abilities to develop and implement successful national security and defence strategies.

References

1. Bobric, G. D. (2021). Risks to the National Security Generated by the Widespread Use of Cryptocurrency. *Buletin Stiintific*, *2*, 87–97. https://doi.org/10.2478/bsaft-2021-0011
2. Carr, M. (2016). Public-private partnerships in national cyber-security strategies. *International Affairs, 92(1)*, 43–62. https://doi.org/10.1111/1468-2346.12504
3. Corradi, E. (2016). Rethinking Islamized Balkans. *Balkan Social Science Review*, 8, 121–137.
4. Dalgaard, N. A. (2017). Organizational resilience in national security bureaucracies: Realistic and practicable? *Journal of Contingencies & Crisis Management*, 25(4), 341–349. https://doi.org/10.1111/1468-5973.12164
5. Denning D. E. (2001). Activism, hacktivism, and cyberterrorism: The internet as a tool for influencing foreign policy. In: Networks and Netwars: The Future of Terror, Crime, and Militancy, J. Arquilla and D. F. Ronfeldt (eds), pp. 239-288
6. Dinicu, A. (2020). The Strategic Dimension of the Public Health Sector in the Global Age. The Nexus between Public Health and National Security. *Revista Academiei Fortelor Terestre, 25(2),* 100–107. https://doi.org/10.2478/raft-2020-0012
7. Estevens, J. (2018). Migration crisis in the EU: developing a framework for analysis of national security and defence strategies. CMS 6, 28 https://doi.org/10.1186/s40878-018-0093-3
8. Farbotko, C. (2018). Climate change and national security: an agenda for geography. *Australian Geographer*, 49(2), 247–253. https://doi.org/10.1080/00049182.2017.1385119
9. Gečienė-Janulionė, I. (2018). The Consequences of Perceived (In)security and Possible Coping Strategies of Lithuanian People in the Context of External Military Threats. *Journal on Baltic Security,* 4(1), 5–14. https://doi.org/10.2478/jobs-2018-0003
10. Gnatyuk, S., Gnatyuk, V., Kononovich, V., & Kononovich, I. (2016). Transformation of Information and Social-Psychological Security Paradigms (Part 2). *Informatics & Mathematical Methods in Simulation*, *6*(4), 322–332. Трансформация парадигм защиты информации, информационной и социально-психологической безопасности (часть 2) Трансформація парадигм захисту інформації, інформаційної та соціально-психологічної безпеки (частина 2)
11. Greiman, V. A. (2016). National Intelligence, Corporate Competitiveness and Privacy Rights: Co-existing in Cyberspace. *Global Studies Journal*, *9*(3), 43–56. https://doi.org/10.18848/1835-4432/CGP/v09i03/43-56
12. Heide, M. (2022). From Threat to Risk: Changing Rationales and Practices of Secrecy. *Public Integrity*, *24*(3), 254–266. https://doi.org/10.1080/10999922.2021.1932144
13. Kislyakov, P. A. (2018). Retro-Innovation of 21st Century Education as a Resource for Ensuring National Security. *Russian Social Science Review*, *59*(1), 59–70. https://doi.org/10.1080/10611428.2018.1424442
14. Knezović, S., Cvrtila, V., & Vučinović, Z. (2017). Croatia's police and security community building in the Western Balkans. *Eastern Journal of European Studies*, 8(2), 167–184.
15. Kononov, S. V., & Zhukov, A. V. (2020). The Philosophy of Security in the Globalizing Culture System. *Journal of History, Culture & Art Research/Tarih Kültür ve Sanat Arastirmalari Dergisi*, 9(3), 415–422. https://doi.org/10.7596/taksad.v9i3.2848
16. Kovács, L. (2018). National Cyber Security as the Cornerstone of National Security. *Revista Academiei Fortelor Terestre*, 23(2), 113–120.
17. Layton, P. (2015). The 2015 National Security Strategy and Strategic Defence and Security Review choices: grand strategy, risk management or opportunism? *Defence Studies*, 15(1), 28–45. https://doi.org/10.1080/14702436.2014.1002286
18. Mara, D., Nate, S., Stavytskyy, A., & Kharlamova, G. (2022). The Place of Energy Security in the National Security Framework: An Assessment Approach. *Energies* (19961073), 15(2), 658. https://doi.org/10.3390/en15020658
19. Ministry of Defense. (2016). Defense Technology Strategy. Japan Ministry of Defense. https://www.mod.go.jp/atla/en/policy/pdf/defense_technology_strategy.pdf Accessed on January 16, 2022.
20. Ministry of Defence. (2022). Defence Artificial Intelligence Strategy Draft. UK Ministry of Defence. https://www.gov.uk/government/publications/defence-artificial-intelligence-strategy/defence-artificial-intelligence-strategy Accessed on January 16, 2022.

21. Nacita, I., & Reith, M. (2018). Cyber War and Deterrence: Applying a General Theoretical Framework. *Air & Space Power Journal*, 32(2), 74–83.
22. Nang, R. N., & Martin, K. (2017). Global Health Diplomacy: A New Strategic Defense Pillar. *Military Medicine*, *182*(1), 1456–1460. https://doi.org/10.7205/MILMED-D-15-00500
23. Obreja, C. Ștefan, & Metea, I.G. (2018). The Implications of the Demographic Decrease on National Security. *Revista Academiei Fortelor Terestre*, *23*(1), 41–47.
24. Овчиников, А. И. (2020). Безопасность личности и государства в цифровую эпоху: политико-правовой аспект. *Journal of Russian Law*, 6, 5–21. https://doi.org/10.12737/jrl.2020.064
25. Pătrașcu, P. (2021). Emerging Technologies and National Security: The Impact Of Iot In Critical Infrastructures Protection And Defence Sector. *Revista Academiei Fortelor Terestre,* 26(4), 423–429. https://doi.org/10.2478/raft-2021-0055
26. Република Србија. (2020). Стратегија националне безбедности Републике Србије. https://www.mod.gov.rs/lat/4350/strategije-4350. Accessed on January 16, 2022.
27. Република Србија. (2020). Стратегија одбране Републике Србије https://www.mod.gov.rs/lat/4350/strategije-4350. Accessed on January 16, 2022.
28. Službeni glasnik. (2020), Odluka o proglašenju vanrednog stanja. “Službeni glasnik RS”, broj 29 od 15. Marta 2020. Available at https://www.pravno-informacioni-sistem.rs/SlGlasnikPortal/eli/rep/sgrs/predsednik/odluka/2020/29/1/reg Accessed on January 16, 2022.
29. US Department of Defence. (2021) STEM Strategic Plan FY2021 – FY2025. US Department of Defence, Alexandria VA, https://dodstem-assets.dodstem.us/files/DoD_STEM_Strategic_Plan_2021.pdf Accessed on January 16, 2022.
30. Veebel, V., & Ploom, I. (2018). Estonia’s comprehensive approach to national defence: origins and dilemmas. *Journal on Baltic Security*, 4(2), 10–22. https://doi.org/10.2478/jobs-2018-0007
31. White, D. (2020). The National Security Implications of Climate Change: Redefining Threats, Bolstering Budgets, and Mobilizing the Arctic. *Journal of International Affairs*, 73(1), 321–329.

Acknowledgement

This paper was written as a part of the scientific research project funded by the Ministry of Defence, Republic of Serbia, number: VA-DH/1/22-24 "Defence system capability development management model".

Original Scientific Paper/Originalni naučni rad UDC/UDK: 658:008(497.11)
616.98:578.834
Paper Submitted/Rad primljen: 23. 5. 2022.
Paper Accepted/Rad prihvaćen: 8. 7. 2022.
DOI: 10.5937/SJEM2202055I

Uticaj pandemije COVID 19 na poslovne procese u kreativnim industrijama - analiza slučaja Kulturnog centra Beograda

Aleksandar Ilić[2]

[1]Kulturni centar Beograda, Knez Mihailova 6, 11000 Beograd aleksandar.ilic@kcb.org.rs

Apstrakt: Kulturni centar Beograda je nastao 1957. godine kao okosnica stvaranja kulturno-umetničkog sadržaja prestonice Socijalističe Federativne Jugoslavije u svojstvu epicentra promišljanja kulturnog delovanja. Njegova prvobitna misija promovisanja najviše umetničke i kulturne vrednosti u Beogradu se vremenom menjala kako su se kulturno-umetnička dostignuća transformisala u novi pojmovnik kreativnih industrija.

Dolaskom COVID 19 pandemije u Srbiju 2019. godine počinje serija kontra-epidemioloških mera koje po svojoj prirodi ili drastično smanjuju fizički protok ljudi zbog ograničavanja broja ljudi u zatvorenim prostorima ili transformišu tipologiju interakcije pojedinaca. S obzirom na to da Kulturni centar Beograda ima jedinstvenu programsku koncepciju i geografski se nalazi u samom centru Beograda, uticaj pandemije ima izrazit uticaj na finansijsko prihodovanje i konverzno na poslovne procese unutar sistema.

Serija faznih reinženjeringa poslovnih procesa koji su stub kulturno-umetničkog delovanja se implementira kako bi se u post-COVID okruženju Centar vratio u normalne tokove kultuno-umetničkog života Beograda i regiona.

Ključne reči: Kulturni centar Beograda, COVID19, finansijsko poslovanje, reinženjering poslovnih procesa, kreativne industrije

Effects of COVID 19 on Business Processes in Creative Industries - case study of Cultural Centre of Belgrade

Abstract: The Cultural Centre of Belgrade was created in 1957 as the focal point of cultural and artistic development of the then capital of Socialist Federative Republic of Yugosavia and an epicentre of contemplation of artistic foundations. Its original mision was the promotion of highest artistic and cultural values in Belgrade has changed over time as the very content of arts and culture have made a transition into the conept of creative industries.

With the arrical of COVID19 pandemic into Serbia in 2019, a series of contra-epidemiologial measures have been implemented that have by their very nature either drastically reduced physical visits by people and/or have transformed the nature of human interaction. Given that the Cultural Centre of Belgrade has a unique programme concept and it is geographically located in the heart of Belgrade, the effects of the pandemic had a deep impact on the financial functioning and have thus affected the business processes in the system.

A series and phased reengineering programmes have been implemented in the business processes, as they are the main pillar of the sustainability of creative functioning and output so that the Centre can continue to fulfill its mission in the post COVID environment. Their functioning remains to be closely monitored.

Key words: Cultural Centre of Belgrade, COVID19, financial indicators, reengineering of business processes, creative industries

1. Introduction

Informative cultural center, as it was called in the middle of the twentieth century, the Cultural Center of Belgrade was improving and, as the focus and goal of its existence, directed its interest and activity towards the presentation and creation of cultural and artistic events both in the mother country of Serbia and outside its borders. The Cultural Centre of Belgrade, with its programs, which it really tried to make unique and never seen before, still organizes important cultural manifestations that are a mirror of the capital of Serbia. Five program units form the backbone of the program work of the Cultural Center of Belgrade and they are: art, music, literature, film and multimedia. All these units try to present domestic and foreign artistic creations to the public in their own unique way. The most significant among the mentioned entities is the October Salon, which is considered a traditional city event. In addition to it, the Guitar Art Festival, Flute Festival, Organ Days, and Poetry in Belgrade's everyday life are certainly no less important. That the Cultural Center is furthermore geographically placed in order to maximise its social impact and financial revenue (Lazzaro and Noonan, 2021). Some of such programs are: Young Art Scene, Fair of Cultural Periodicals, Child and Culture, Festival of a Writer.

Each of the mentioned manifestations requires HR input from people who work in the Cultural Center of Belgrade and their enthusiasm. Having existed gor over 75 years the needs of its audeince have transformed as in other similar institutions (Zeng and Yang, 2022) . When we say material resources, of course we mean money, but in addition to money, we also need a space in which the events will take place. Therefore, from that point of view, the cultural center has over 2,000 m^2, and from that square footage, the aforementioned Belgrade showcase covers an area of 565 m^2, providing enough space for high-quality artistic work. In addition to the Belgrade storefront, Artget Gallery with its 280 m^2, IPS bookstore 340 m^2, studios and depots 350 m^2 and supporting rooms with a square footage of 366 m^2 provide maximum conditions not only for design and art value of such an instituion (Huang and Jia, 2022) but also as diplomatic tool (González Fernández, 2021).

2. Organizational structure of the CCB

The organizational structure of the Cultural Center Belgrade, in addition to the Supervisory Board, the Board of Directors and the Director, also consists of organizationally positioned workplaces that ensure the high-quality work of the center. Below is a schematic representation of the organizational structure of the Belgrade Cultural Center.

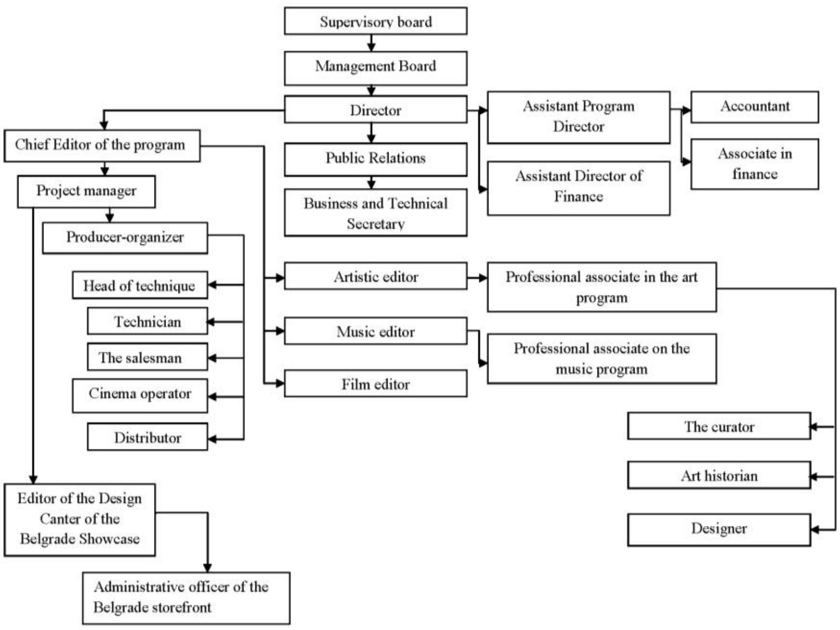


Figure 1: Organizational structure of the Belgrade Cultural Centre as addopted by the City Council of the City of Belgrade

Source: (CCB, 2022)

The aforementioned organizational schematic hase been clearly designed bearing in mind the concept of defining an entreprenurial ecosystem for creative institutions in order to maintain a level of self sustainability in neo-liberal econommic systems (Brydges and Pugh, 2021). It can be noticed that there is a clear deliniation of artistic and creative activities (Churski, *et al.* 2017) that are supported by technical and administrative staff functions.

3. Financial revenues and COVID19 effects

The CCB is mainly funded as an institution from grants from the City of Belgrade Council, it experiences the same issues of free funding and crowd funding as other institutions in develeoping economies (Lazzaro and Noonan, 2021).

Issues of donations in Serbia are further comlicated as not only that there are no financial incentives to donate to cultural institutions but there are furhter complications as these donations are subject to further taxation. It is also a wider issue in the sense that, although recognised, few academic papers have dealt with specificities of funding of creative industries (Wijngaarden, Hitters, and Bhansing, 2019).

The figure below shows the direct effects of COVID19 onto EBIDTA of the Belgrade Storefront Shop in the sense that it shows the EBIDTA in the year before the pandemic breakout, followed by the year of the outbreak and then two further years (2021 and 2022). Note that during the months of MArch and April, the curfues have had an absolute devastating effect of almost 0 (zero) EBIDTA reported in thea accounts for April.Also the projections by teh Cultural Centre are that the EBITDA for 2022 August of 2022 will be that equivalet to 2019 (CCB, 2022).

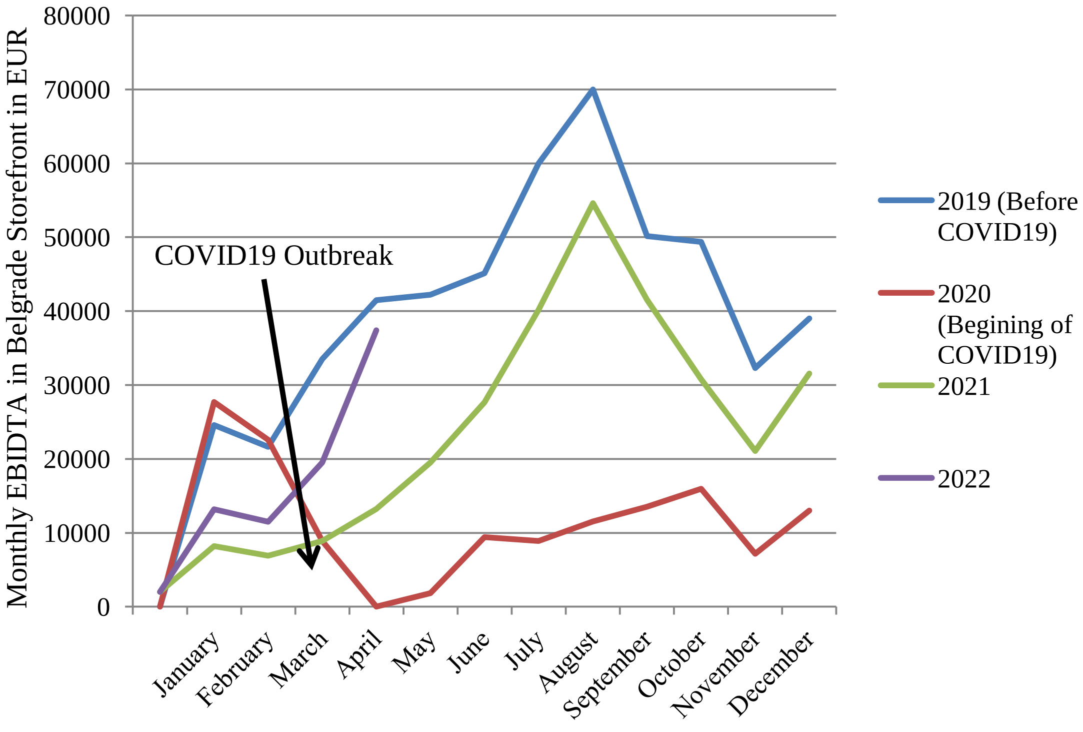


Figure 2: Monthly EBITDA of BCC Storefront Shop in Euro in the year before COVID outbreak, during rthe COVID19 pandemic and two following years

Source: (CCB, 2022)

In creative industries, effects of different creative components have specific impact on employment dynamics (Cicerone, Crociata, and Mantegazzi, 2021). Wellness and consumer habits (Eddy *et al.* 2021) for both cultural products and art reduced drastically which is in line with previous reseach relating to COVID and COVID patients families and friends (Stieger, Lewetz, and Swami, 2021).

Distancing regulations (Koivunen *et al.*, 2022) as defined by the UN have had further impact on the maximum numbers of persons allowed in enclosed spaces and this also had a profound effect on seating arrangements in cinemas and theatres (Upadhyay and Maroof, 2020). Furthermore, non COVID patients and their families have also changed their attitude towards creative industries (Adeke, Zava, and Etika, 2021).

As a direct result of the lack for need of executives in the sales department, cinema operators and distributors, several positions were automatically made redundant during the pandemic. As "lasting success requires not only foresight, but shaping future that is part of forward thinking " (Sokół and Figurska, 2021), the CCB has reshaped its organizational structure and in turn reengineered the financial processes to mitigate risks (Van Der Made, 2021).

4. Reengineering of processes relating to financial fluctuations

A set o reorganizational measures was observed immediately after the pandemic that had the following steps:

1. Non-essential staff were reassigned to new roles as support staff to the roles that were previously not filled;
2. Staff that had previously had direct contact with customers and clients were redirected to complete their annual reviews in the weeks to come so that once the CCB was open there was no time that was to be lost in administrative procedures:
3. Restocking and resupplying was to take place immediately as most of the competition was concerned and was not reordering standard supplies (therefore it would be cheaper as there was less demand);
4. Individual artists were to be given annexes to their contracts asking for higher output by volume and therefore per cost unit prices as they were most likely left without current contracts;
5. Annual maintenance that was to take place normally in the next 12 months was to be rescheduled in the next month:
6. Contracts were to be renegotiated and new financial deadlines set;
7. All contracts that can be terminated at a 30 days notice were terminated immediately.

The aforementioned reorganizational measures can be grouped in three main sets that are functionally separate units:

1. Those that pertain to financial debt restructuring and reorganizing of an entity that shares the same ownership structure as the original company but is a separate entity and thus allowing for a grace period amongst de-facto different departments of the same corporation to give each other grace periods (Kokorin, 2021). This was particularly important as unnecessary financial and legal burdens would be placed in motion between legal entities, all of which have been founded by the same body: Council of the City of Belgrade;
2. Human resource management policy (Scalabrini, Xu, and Northoff, 2021) shifted its focus from day-to-day maintenance and running to other aspects of the organizational functioning to those that were left for medium term maintenance and that reducing lag time in monthly contracts;
3. Services that would have otherwise higher costs were rushed as there was a wide spread uncertainty, and were thus reduced in their price.

The aforementioned functional groups had the following financial ramifications which had then in turn had post COVID financial ramifications:

1. Financial transactions between connected legal entities were frozen and thus costs did not incur;
2. Costs of human capital were reduced as the otherwise empty slots were rescheduled and reorganized;
3. Services that were to be paid at a higher cost were acquired earlier and thus at a lower cost at an annual level.

Therefore the simple steps of organisational reengineering that were then condensed into a set of functional grouping had a direct financial impact that allowed the following:

1. Once the post COVID19 operations resumed, no human resources were lost and thus the day to day operations could resume normally without hindrance;
2. Within on year of post COVID19 operating, in the second year, EBIDTA returned to its post COVID19 levels.

The aforementioned can be summarised as follows:

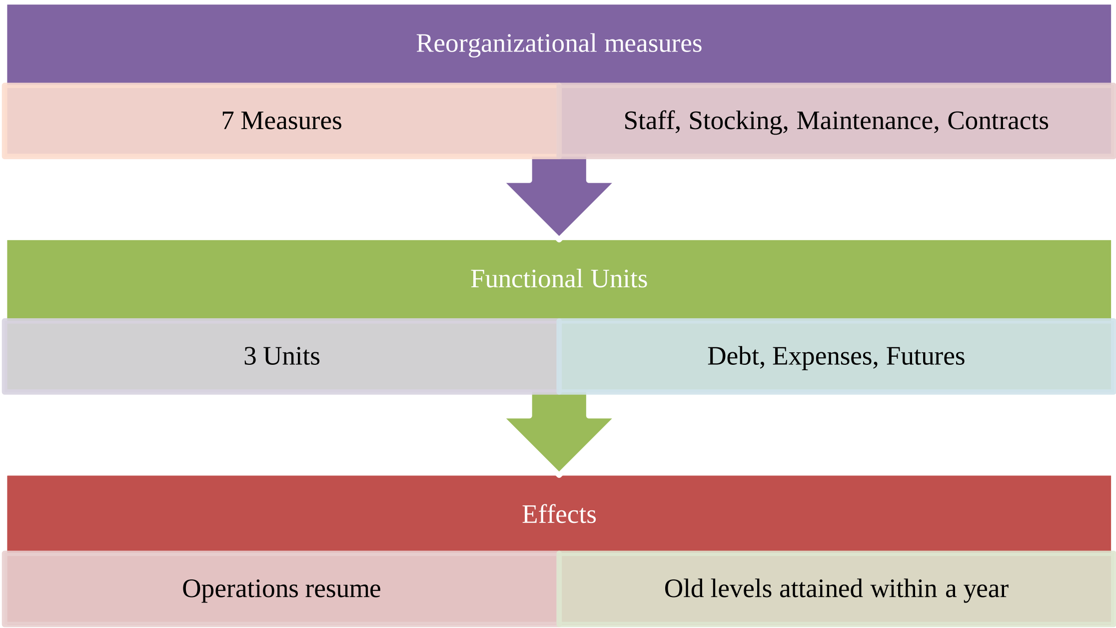


Figure 3: Condensational of the effects of organizational measures taken that have resulted in functional effects on the organization having ultimate fiscal/financial Effects

Source: (author)

5. Future Predictions

Based on the current data it is estimated that the new EBIDTA for 2022 will reach the levels of 2019 which was the year prior to COVID19 outbreak in Serbia:

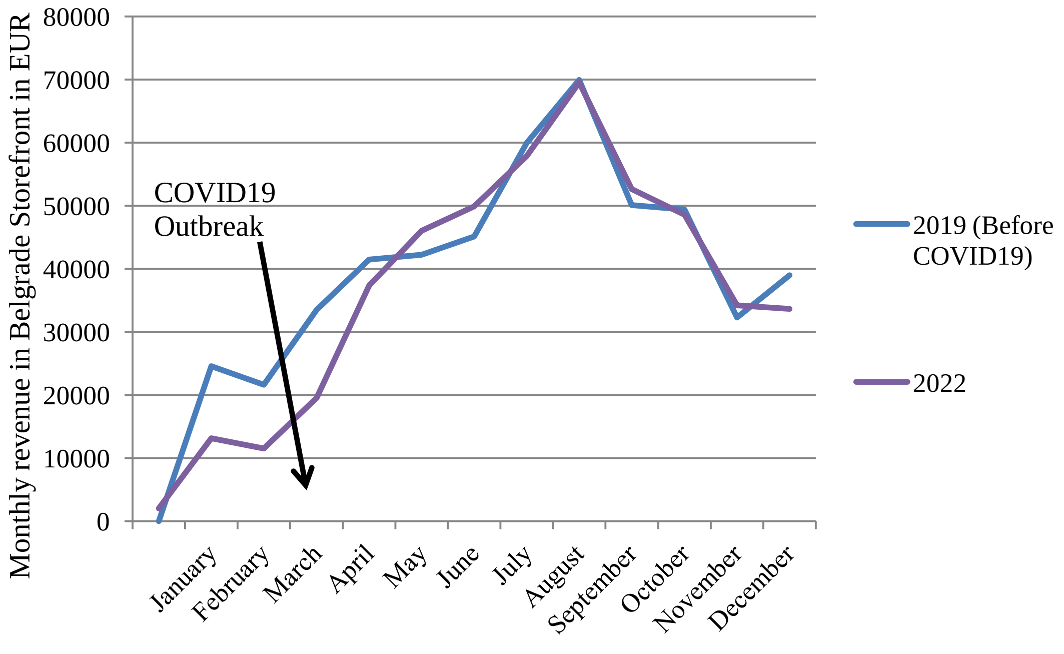


Figure 3: Predictions of monthly EBITDA of BCC Storefront Shop in Euro for 2022 and in the year before COVID outbreak

Source: (CCB, 2022)

6. Conclusions

The Cultural Centre of Belgrade is a cultural institution that forms the focal point of Belgrade's cultural and artistic community. As all other focal points of artistic creation and cultural life, it has transformed from a transactional 20th Century model of a cultural point to a transformational cloud of creative industries. As all centres of creative industries it has been heavily influenced by the COVID19 pandemic as all other communities that are people grounded.

Social distancing, police curfews, realignment of what is socially perceived as important, and general fear of future financial aspects have influenced its financial income relating to its EBITDA in its main store the Belgrade Storefront Shop.

The management of the Cultural Centre has implemented a set of carefully monitored 7 (seven) steps of organizational reengineering relating to staff, stocking, maintenance and existing contracts monitored carefully results in 3 (three) functional effects that are directly tied to reducing debt, offsetting expenses, revaluating future expenses. All of the 3 functional effects have had a direct financial impact reducing the negative effects of the drastically reduced EBITDA in the year 2020 during the COVID19 pandemic. There functional effects have a direct effect on a fast rebound of operations to previous levels within one full year and within the next.

Therefore one can conclude that organizational reengineering caused by adverse effects, can result in functional overhaul that can in turn have mitigating influences and effects on financial functioning, that can in turn have mitigating effects on the negative external influences that are beyond the control of the organization, its design, and purview.

References

1. Zeng, H. and Yang, L. (2022). The Innovation and Development Path of Cultural and Creative Industries in Anhui Province, China: Nvivo12-Based Policy Text Analysis, *Computational Intelligence & Neuroscience*, pp. 1–11. doi:10.1155/2022/6202746.
2. Huang, L. and Jia, Y. (2022). Innovation and Development of Cultural and Creative Industries Based on Big Data for Industry 5.0, *Scientific Programming*, pp. 1–8. doi:10.1155/2022/2490033.
3. González Fernández, S.M. (2021). The Role of the Cultural and Creative Industries in Cultural Diplomacy and Soft Power between China and the European Union, *Janus.Net: e-Journal of International Relations*, 12(1), pp. 31–61. doi:10.26619/1647-7251.12.1.3.
4. Brydges, T. and Pugh, R. (2021). Coming into fashion: Expanding the entrepreneurial ecosystem concept to the creative industries through a Toronto case study, *Canadian Geographer*, 65(3), pp. 346–367. doi:10.1111/cag.12674.
5. Kaymas, S. (2020). Geography ... is it your destiny? Culturally sustainable development and creative industries nexus in the case of Turkey, *European Planning Studies*, 28(10), pp. 2040–2059. doi:10.1080/09654313.2019.1694865.
6. Lazzaro, E. and Noonan, D. (2021). A comparative analysis of US and EU regulatory frameworks of crowd funding for the cultural and creative industries, *International Journal of Cultural Policy*, 27(5), pp. 590–606. doi:10.1080/10286632.2020.1776270.
7. Wijngaarden, Y., Hitters, E. and Bhansing, P.V. (2019). “Innovation is a dirty word”: contesting innovation in the creative industries, *International Journal of Cultural Policy*, 25(3), pp. 392–405. doi:10.1080/10286632.2016.1268134.
8. Cicerone, G., Crociata, A. and Mantegazzi, D. (2021). Cultural and creative industries and regional diversification: Does size matter?, *Papers in Regional Science*, 100(3), pp. 671–687. doi:10.1111/pirs.12585.
9. Stieger S, Lewetz D, Swami V. (2021). Emotional Well-Being under Conditions of Lockdown: An Experience Sampling Study in Austria During the COVID-19 Pandemic, *Journal of Happiness Studies*; vol 22, pp. 2703–20. doi:10.1007/s10902-020-00337-2

10. Adeke, P.T., Zava, A.E. and Etika, A. (2021). The impact of COVID-19 pandemic on travel behaviour of commuters in Makurdi metropolis, *Cogent Engineering*, 8(1), pp. 1–14. doi:10.1080/23311916.2021.1960249.
11. Upadhyay, M. and Maroof, K. (2020). Understanding the emerging and reemerging terminologies amid the COVID-19 pandemic, *Journal of Family Medicine & Primary Care*, 9(12), pp. 5881–5887. doi:10.4103/jfmpc.jfmpc_960_20.
12. Sokół, A. and Figurska, I. (2021). The Importance of Creative Knowledge Workers in Creative Organization, *Energies (19961073)*, 14(20), p. 6751. doi:10.3390/en14206751.
13. Kokorin, I. (2021). Promotion of group restructuring and cross-entity liability arrangements, *Journal of Corporate Law Studies*, 21(2), pp. 557–593. doi:10.1080/14735970.2021.1925484.
14. Van Der Made, M. (2021). Risk Management for Art Collections and Archives, *New Review of Information Networking*, 26(1/2), pp. 81–91. doi:10.1080/13614576.2019.1608579.
15. Scalabrini, A., Xu, J. and Northoff, G. (2021). What COVID-19 tells us about the self: The deep intersubjective and cultural layers of our brain, *Psychiatry & Clinical Neurosciences*, 75(2), pp. 37–45. doi:10.1111/pcn.13185.
16. Koivunen, K. *et al.* (2022). Maintenance of high quality of life as an indicator of resilience during COVID-19 social distancing among community-dwelling older adults in Finland, *Quality of Life Research*, 31(3), pp. 713–722. doi:10.1007/s11136-021-03002-0.
17. Churski, P. *et al.* (2017). Internationalization as a challenge for geographical education in Poland: experience of a new postgraduate study "cultural industries in the development policies of cities and regions", *Journal of Geography in Higher Education*, 41(4), pp. 506–520. doi:10.1080/03098265.2017.1337088.
18. Eddy, M. *et al.* (2021), Local-level implementation of Social Emotional Learning in arts education: moving the heart through the arts, *Arts Education Policy Review*, 122(3), pp. 193–204. doi:10.1080/10632913.2020.1788681.

Original Scientific Paper/Originalni naučni rad UDC/UDK: 37.015.3-057.875
Paper Submitted/Rad primljen: 11. 5. 2022.
Paper Accepted/Rad prihvaćen: 8. 7. 2022.
DOI: 10.5937/SJEM2202062I

Motivacija studenata Fakulteta za inženjerski menadžment prilikom učenja stranog jezika

Jelena Ilić[1], Aleksandra Vojvodić[2], Jasmina Jovanović[3]

[1]Univerzitet „Union-Nikola Tesla“, Fakultet za inženjerski menadžment, Bulevar vojvode Mišića 43, Jelena.ilic@fim.rs
[2]LanguageFactory foreign language school, Belgrade, Serbia, sandra.vojvodic@gmail.com
[3]Univerzitet „Union-Nikola Tesla“, Fakultet za inženjerski menadžment, Bulevar vojvode Mišića 43, jasmina.jovanovic@fim.rs

Apstrakt: Ovaj rad se bavi motivacijom za učenje drugog stranog jezika sa stanovišta nastave drugog stranog jezika u privatnim tercijarnim ustanovama u Srbiji. U jednoj visokoškolskoj ustanovi sprovedeno je istraživanje među studentima koji mogu da biraju između dva druga strana jezika, francuskog i španskog. Istraživanje je imalo za cilj otkrivanje unutrašnjih pokretača motivacije za učenje dodatnih stranih jezika u cilju prilagođavanja nastavnih planova i programa potrebama i prioritetima učenika u cilju postizanja boljih ishoda učenja. Rezultati istraživanja pokazuju da iako postoje male razlike u unutrašnjim pokretačima između ova dva jezika, glavni pokretači ostaju isti – profesionalni razvoj, lični razvoj i želja da se uroni u drugu kulturu. Nastavnici su bili u mogućnosti da prilagode svoje nastavne planove i programe kako bi bolje zadovoljili potrebe učenika i da iskoriste ovu konkretnu interakciju između unutrašnje i ekstrinzične, ili integrativne i instrumentalne, motivacije svojih učenika.

Ključne reči: motivacija, drugi strani jezik, privatne visokoškolske ustanove, Srbija, francuski jezik, španski jezik

The motivation of the Students of the School of Engineering Management When Learning a Second Language

Abstract: This paper deals with the motivation behind learning a second foreign language seen from the point of view of teaching second foreign language in private tertiary institutions in Serbia. A survey has been conducted in one tertiary institution among its students who can choose between two second foreign languages, namely French and Spanish. The survey aimed at discovering internal drivers behind the motivation to learn additional foreign languages with a view of adapting the curricula to the needs and priorities of students in order to achieve better learning outcomes. The results of the survey show that although there are slight differences in internal drivers between those two languages, the main drivers remain the same – professional development, personal development and desire to immerse oneself in another culture. The teachers were able to adapt their curricula to better meet the needs of students and to leverage this particular interplay between intrinsic and extrinsic, or integrative and instrumental, motivations of their students.

Keywords: motivation, second foreign language, private tertiary institutions, Serbia, French Language, Spanish Language

1. Introduction

The existence of plurilingualism and multiculturalism in Europe foregrounds the need for learning various languages. Mastering one or even several foreign languages is part of European reality. If we want to grow professionally and personally, it is essential to learn a second, even a third foreign language. This is the reason why students in Serbia are increasingly choosing to learn French or another second foreign language.

This article aims to explore the motivation of the students (over the age of 18), enrolled at the School of Engineering management, who wish to learn or deepen their knowledge of foreign languages. We will pay particular attention to the motivation of the students while emphasizing the importance of teaching the culture and civilization of the given language. In order to discern the motives of learners, we offered a questionnaire to students enrolled in the School of Engineering Management, with a view of obtaining a better understanding of their own intentions and personal goals.

Based on the results of the survey, the teachers insist on updating the methodology of teaching these languages, some of which have a long tradition in education in Serbia, by offering learners a whole range of diverse approaches aimed at better motivating them. Given that the survey included a heterogeneous audience, we believe that the results obtained show an accurate and detailed picture of French and Spanish learning in private universities in Serbia.

2. Motivation

When it comes to learning a foreign language, motivation is one of the main internal factors (Bilić-Štefan, 2008). This complex phenomenon involves many elements and can play a crucial role in the quality and the speed of learning (Carpenter, Torney, 1973; Cloud, Genesee, Hamayan, 2000; Bunch, Byram, 2004).

Apart from the classic concept of motivation which distinguishes extrinsic motivation, that is to say - motivation which motivates from the outside, from intrinsic motivation which motivates from the inside, it is important to define the concept of motivation when it comes to learning a foreign language, in particular a second foreign language. In this context, it is important to refer to the work of the famous social psychologists Gardner and Lambert who have exposed their research on motivation in their book *A study of the roles of attitudes and motivation in second-language learning* (Gardner, 2000; Gardner, 2001; Gardner, 2010). According to them, the motivation embraces three different components: the effort, the desire and the positive attitude. The combination of these three elements makes the learner truly motivated, provided that his desire to accomplish the goal and his favorable attitudes towards the goal are proportionate to the effort invested. The two psychologists distinguish between integrative motivation and instrumental motivation (Gardner, 2000; Gardner, 2001; Gardner, 2010).

The integrative motivation is based on the learner's need to adapt to the culture of the group whose language they are learning (Cloud, Genesee, Hamayan, 2000). He wants to learn the language to be able to better understand and to get to know the people who speak this language. When this need is associated with the effort invested in reaching the goal; desire to learn a language and the accompanying positive favorable reaction to the language as well as with the environment and the context in which the language is spoken, then these factors combine to incite a real integrative motivation. Without all these factors, the integrative orientation is a goal that lacks motivation. It can happen that a person is integratively oriented, but not very motivated to learn a foreign language. In many researches carried out on this subject it was concluded that learners who have integrative motivation rather than instrumental one, demonstrate a higher level of motivational intensity. (Dörnyei, Schmidt, 2001; García, Náñez, 2011).

Unlike the integrative motivation, instrumental motivation represents a utilitarian orientation. It represents the desire to learn a foreign language in order to accomplish a certain goal such as obtaining a job, advancing in the career, enrolling in university and so on. There is no socio-emotional context, the language is learned only for pragmatic reasons (Lanvers, 2017). The instrumental motivation can be very strong and often even stronger than integrative motivation (Genesee, Paradis, Crago, 2004; Lasagabaster, Doiz, Sierra, 2014). Even though it is considered high-intensity motivation, it tends to be short-termed. Thus, Gardner distinguishes integrative motivation as dominant since the integratively oriented learner will have a positive attitude towards the language (Gardner, 2000; Gardner, 2001; Gardner, 2010). A person can be oriented by both instrumental and integrative motivation, since one motivation does not preclude other. However, success depends not only on integrative motivation or instrumental motivation but on a motivation that develops dynamically during the learning process (Thomas, Collier, 2012).

3. Empirical study

In order to better understand their own motivations and personal goals of adult Serbian learners, we have conducted a survey aimed at obtaining an accurate and detailed overview of dynamics of learning of foreign languages in higher education in Serbia. In order to do so, we have presented a questionnaire to the students enrolled at the School of Engineering Management. The second foreign language is an elective course for those students and they can choose between French and Spanish language.
The survey included a heterogeneous audience of 214 people, including the students of all 4 years of the School. 108 of all the respondents chose French language as the second language and 106 respondents chose Spanish.

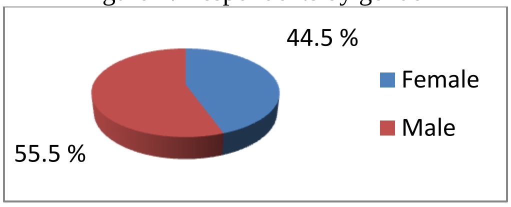
Although there is big difference in perception of those two languages, one having a long tradition of learning and the other being a novelty in Serbian educational system, we believe that the basic reasons for choosing one or the other are very similar.

Learning French language has a long tradition in Serbia. Indeed, it is the second foreign language taught in public and private schools after English, which occupies the dominant place. French is also present in many private language schools; however, it is impossible to show the exact figures. Out-of-school education of languages occupies an important place in our country. People enroll in language schools to improve their knowledge of foreign languages, to get a better grade in school or, in rare cases, to learn a third foreign language.

Among the respondents who chose French as a second foreign language, there were 108 students aged from 18 to 35+ years old, 44.5 % females and 55.5% males.

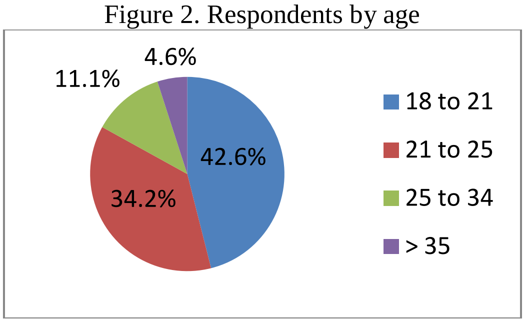
We classified the students according to their age into 4 groups: 18 to 21, 22 to 25, 26 to 34 and over 35. The majority of learners 42.6 % belonged to the first group from 18 to 21 years old, 34.2 % belonged to the second group from 22 to 25 years old, 11.1 % belonged to the third group from 26 to 34 years old and only 4.6 % belonged to the group over 35 years old.

Figure 1. Respondents by gender



Source: Authors

Figure 2. Respondents by age



Source: Authors

All respondents (100%) marked the Serbian language as their mother tongue. On the other hand, the majority of respondents speak or understand at least one foreign language. 93.3% of respondents speak (or understand) another foreign language, 4.5% of respondents speak (or understand) two foreign languages and only 1.2% of French learners say they speak (or understand) three or more foreign languages. All students spoke or understood at least one foreign language.

Our survey shows that the majority of respondents are motivated by professional fulfillment (53.7%), then by the possibility of continuing their studies in a French-speaking country (46.5%), by the beauty and melody of the language (33.8%), 10.3% of respondents are motivated by personal fulfillment, 6.5% of respondents decide to learn French to discover other ways of life and other cultures, while 3.3% of learners learn French because they are forced by their parents.

Table 1. Drive for motivation

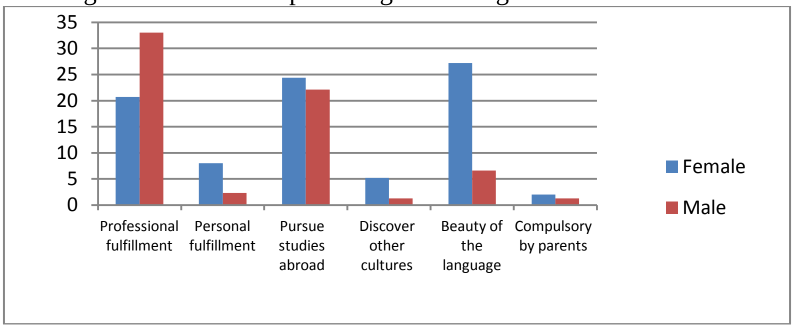
Motivation	%
Professional fulfillment	**53.7**
Personal fulfillment	**10.3**
Pursue studies abroad	**46.5**
Discover other cultures	**6.5**
Beauty of the language	**33.8**
Compulsory by parents	**3.3**

Source: Authors

By analyzing the survey carried out, we can see that the age and gender of the respondents largely determine their motivation. The results of the survey show that men are mainly motivated by professional fulfillment and the idea of being able to pursue their studies in a French-speaking country, while women are more motivated by the beauty and melody of the French language, the possibility to pursue their studies in a French-speaking country, but are also motivated by the professional fulfillment and personal fulfillment that learning the French language offers them. Only 1.2% of men are motivated by possibility to discover other cultures and civilizations, while only 1.2% of women learn French because their parents force them to. It should be noted that respondents could chose more than one answer. From the results obtained on the motivation of learning the French language, we can deduce that the courses should be designed in such a way that the wishes and needs of the learners can be met.

By analyzing the survey carried out, we can see that the age and gender of the respondents largely determine their motivation.

Figure 3. Motivation percentage and the gender of the students



Source: Authors

Equally, we have conducted a survey among the students who have opted to learn Spanish as a second language at the School of Engineering Management.

Firstly, we have to point out to a one important difference in learning Spanish in comparison to French and English. The students who opt for Spanish as a second language have not encountered Spanish in an educational environment before, they have been exposed to Spanish through series, movies, music. In other words, through Spanish culture. In fact, they do not even have a basic knowledge of Spanish, when they chose Spanish as a second language.

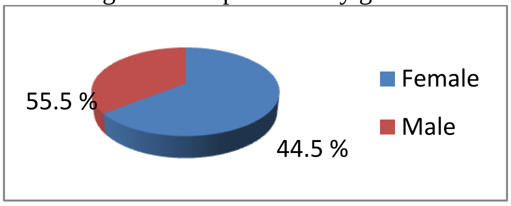
Spanish language has recently been introduced in a few elementary schools in Serbia and some Secondary Schools and these generations have yet to reach the university level. According to the Ministry of Education of Serbia in 2019 only 6 909 pupils learned Spanish in elementary and secondary schools in Serbia.

In addition, we have modified slightly survey questions in comparison to those posed to French students in order to reflect this different learning history of Spanish language and difference in motivation to study Spanish language. Therefore, instead of answer referring to obligation on the part of parents, we have introduced an answer referring to desire to learn completely new language.

Out of 106 respondents none has studied Spanish in school and marginal number has studied it in Language Schools.

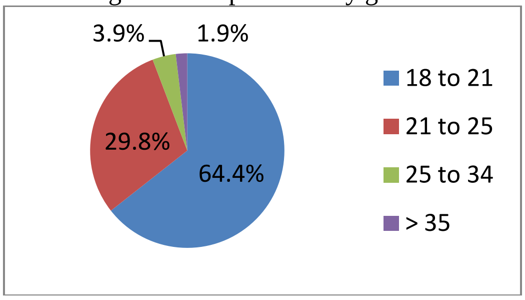
The survey included a heterogeneous audience of 106 people, including 64.3 % females and 35.7 % males. We classified learners according to their age into 4 groups: 18 to 21, 22 to 25, 26 to 34 and over 35. The majority of learners 64.4 % belonged to the first group from 18 to 21 years old, 29.8 % belonged to the second group from 22 to 25 years old, 3.9 % belonged to the third group from 26 to 34 years old and only 1.9 % belonged to the group over 35 years old.

Figure 4. Respondents by gender



Source: Authors

Figure 5. Respondents by gender



Source: Authors

All the respondents (100%) marked the Serbian language as their mother tongue. The majority of respondents speak or understand at least one foreign language. 96.4 % of respondents speak one foreign language, 3.1 % of respondents speak two foreign languages and only 0.5% of Spanish students speak three or more languages foreign.

Table 1. Drive for motivation

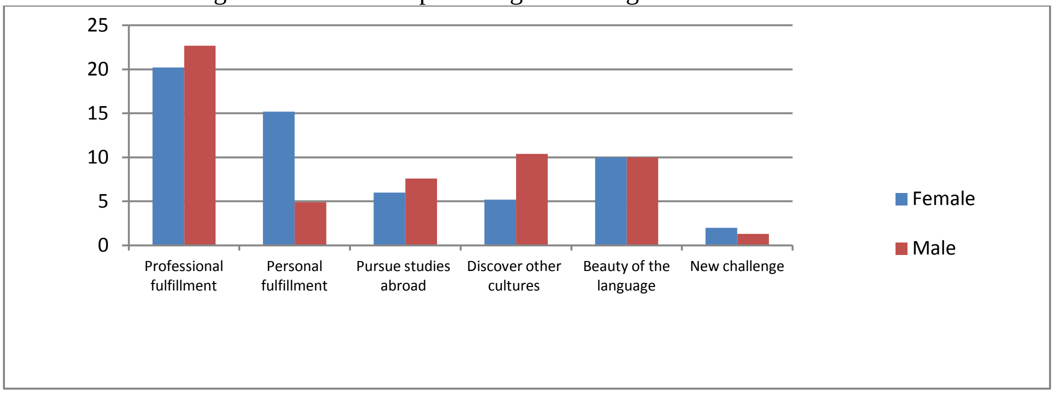
Motivation	%
Professional fulfillment	**42.9**
Personal fulfillment	**21.1**
Pursue studies abroad	**16.6**
Discover other cultures	**13.4**
Beauty of the language	**20**
New challenge	**8.1**

Source: Authors

Our survey shows that the majority of respondents are motivated by professional development (42.9%) in which the size of Latin American market plays a very important role, followed by the possibility to continue studies in Spanish-speaking country (21.1%). Furthermore, 20% of respondents are attracted to beauty and melody of Spanish language, (15.6%) of respondents are motivated by personal development, 13.4% of respondents opt for Spanish to discover other ways of life and other cultures, whereas 8.1% of learners learn Spanish because they welcome a new challenge. It should be noted that students were able to select more than one answer.

By analyzing the survey carried out, we can see that the age and gender of the respondents also play a role in their motivation.

Figure 6. Motivation percentage and the gender of the students



Source: Authors

From the results obtained on the motivation when it comes to learning Spanish language, we can deduce that the courses should be designed in such a way that the wishes and needs of the learners can be met, without losing the quality, rather taking into account what drives their motivation.

4. Conclusion

Whenever we start learning a foreign language, when we acquire a new grammatical structure or a new word and finally when a foreigner becomes our friend, we experience enrichment and satisfaction that we could have miss out on had we not chosen to learn that language. Curious to learn what inspires in adults the thirst for learning French, we proposed a questionnaire on the reasons that had led them to opt for French courses at the School of Engineering Management. Our survey included a heterogeneous audience of 214 people, including 52,3 % female and 47.7 % male. We classified the students according to their age into 4 groups: 18 to 21, 22 to 25, 26 to 34 and over 35. The results of the survey showed that men are mainly motivated by professional fulfillment and the idea of being able to pursue their studies in a foreign country, while women are more motivated by the beauty and melody of the language, the possibility to pursue their studies in a foreign country, but also through the professional fulfillment and personal fulfillment that learning the French language offers them.

Based on the results of this research, we were able to develop the detailed program aimed at improving the French and Spanish skills of our students according to their concrete needs and motivation.

From the results obtained on the motivation for learning the French language, we can deduce that the courses should be designed in such a way so as to take into account the wishes and needs of the students. For example, this part of our research demonstrates that learners are very motivated to continue their studies in a French-speaking country, so we could offer them teaching materials that deal with student life, academic discourses of the formal register as well as informal techniques to better equip them to understand and produce complex interventions on various subjects.

On the other hand, this research demonstrates that learners are very motivated to learn Spanish language because they believe it would be a useful tool in their professional life, to a lesser extent because it can be useful for their academic development. Also, significant number of students show interest in Spanish culture and way of life and Spanish language itself.

Therefore, Spanish teaching material has to show equilibrium of business language and academic language, with emphasis on business and formal language, but content should be enriched with texts on Spanish culture and written in informal register.

This survey delving into motivations behind opting between two different languages, has shown us, that despite difference in perceptions of those two languages, motivations for choosing the second foreign language in academic setting remain almost the same and that needs and priorities of our student are very specific. It has shown us that motivation of our students to study second foreign language stems out of their need to improve their professional and education chances, the desire for personal development and desire to explore and get acquainted with new cultures and new world views. Therefore, it is important to take into account these complex dynamics between different types of motivations and to pay emphasis on cultural immersion in order to simulate integrative motivation, and ultimately to tailor our curriculum and teaching material accordingly to maximize teaching outcomes.

Bibliography

1. Bilić-Štefan, M. (2008). Interkulturalna komunikacijska kompetencija u udžbenicima za engleski jezik u osnovnoj školi. *Odgojne znanosti*, *10*, 231–240.
2. Bunch, G. Byram, M. (Ed). (2004). Routledge encyclopedia of language teaching and learning. Language Policy. 3. 78-81. 10.1023/B:LPOL.0000017851.17683.c9.
3. Carpenter, J. and Torney, J. (1973). *Beyond the melting pot*. In P. N. Markum & J. L. Land (Eds.) Children and intercultural education. Washington, DC: Association for Childhood Education International
4. Cloud, N., Genesee, F., Hamayan, E. (2000). *Dual language instruction: A handbook for enriched education*. Boston, MA: Heinle and Heinle.
5. Curtain, Helena & Carol Ann Dahlberg. (2004). *Languages and Children: Making the Match: New Languages for Young Learners, Grades K-8*. Third Edition. New York: Longman.
6. Dörnyei, Z., Schmidt, R. (Eds) (2001). *Motivation and second language acquisition University* of Hawaii.
7. García, E. E., & Náñez, J. E., Sr. (2011). Best practices and successful strategies. In *Bilingualism and cognition: Informing research, pedagogy, and policy.* (pp. 131-156). Washington, DC: American Psychological Association.
8. Gardner, R. C. (2010). *Motivation in second language acquisition: The socio-educational model.* New York: Peter Lang.
9. Gardner, R. C., (2000). Correlation, causation, motivation and second language acquisition. *Canadian Psychology*, 41, 10-24.
10. Gardner, R. C. (2001). *Integrative Motivation and Second Language Acquisition*. In Z. Dornyei, & R. Schmidt (Eds.), Motivation and Second Language Acquisition, Honolulu: Publishing Company, Ltd.
11. Genesee, F., Cloud, N. (1998). Multilingualism Is Basic. *Educational Leadership,* 55(6), 62-65.
12. Genesee, F., Paradis, J., & Crago, M. B. (2004). *Dual language development & disorders: A handbook on bilingualism and second language learning*. Baltimore, MD: Brookes Publishing Company.
13. Lanvers, U. (2017). Language learning motivation, global English and study modes: a comparative study. *Language Learning Journal*, 45(2) pp. 220–244. DOI: https://doi.org/10.1080/09571736.2013.834376
14. Lasagabaster, D., Doiz, A., & Sierra, J. M. (Eds.). (2014). Motivation and foreign language learning: From theory to practice." Revista Española de Lingüística Aplicada, 28(2), 641-646.
15. Kudela, J. (ed.) (1979) *The problem of French faux-amis in Serbo-Croatian from the lexicographic point of view.*
16. Thomas, W. P., & Collier, V. P. (2012). *Dual Language Education for a Transformed World*. Albuquerque, NM: Fuente Press.

Guidelines for the Preparation of Papers for Publication in the Serbian Journal of Engineering Management

Title of Paper in Serbian

Authors' Name and Surname[1]*, Name and Surname[2], Name and Surname[3] [in this stage leave it empty for the peer review purpose]

[1] Institution and E-mail address [in this stage leave it empty for the peer review purpose]
[2] Institution and E-mail address [in this stage leave it empty for the peer review purpose]
[3] Institution and E-mail address [in this stage leave it empty for the peer review purpose]

Summary in Serbian: This document is a template for formatting the papers in order to prepare them for printing. This summary provides briefly the information related to the content of the article so that the reader can rapidly and accurately assess its relevance. Authors should explain the goals of research or state the reason (reasons) why they have written the article. Then, it is necessary to describe the methods used in the study and briefly describe the results they have obtained in the research. The abstract should be between 100 and 250 words long.

Keywords: 3-5 keywords for indexing and search purposes

Title of Paper in English

Abstract in English: This document presents a template for preparing the print-ready papers that will be included in the Serbian Journal of Engineering Management. The abstract briefly summarizes the article and gives the reader the opportunity to assess its relevance. The authors should elaborate the goals of the research or state their reason (reasons) for writing the paper. It is additionally required for them to describe the methods used during the research and give a brief description of the results and conclusions of the research. The abstract should be between 100 and 250 words long.

Keywords: 3-5 keywords for indexing and search purposes

1. Introduction

The paper should be written using MS Word for Windows (on Serbian Cyrillic, Latin or English – UK keyboard). The length of work should not be more than 10 pages including text, diagrams, tables, references, and appendices.

The format is **A4**. Use **2 cm** for the lower and upper margin and **2.5 cm** for the left and right margin. The spacing within one paragraph should be one (single), while the spacing between paragraphs is double. To format the text, it is recommended to use font Times New Roman.

2. Structure of the paper

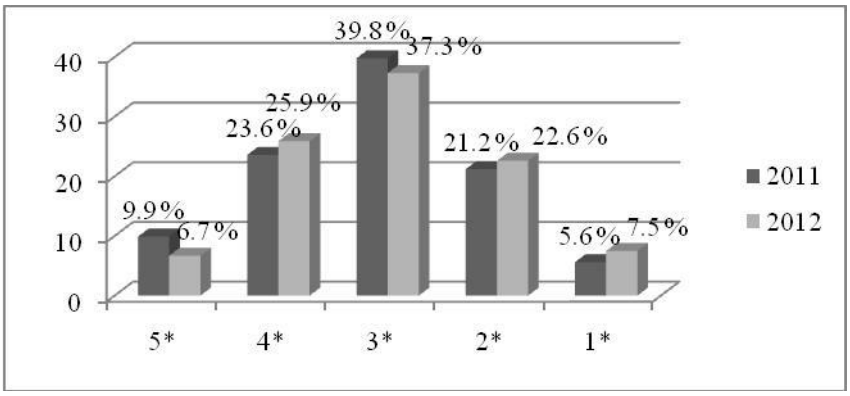
In the first line of the first page the title should be written in Serbian language (16 pt). Under the title of the paper the spaces for name(s) of the author and the names of the author's institutions should be indicated as specified and aforementioned in this Guideline. After the space for the institution of the last author, leave one blank line and write the short summary (10 pt) in Serbian. After the summary, provide an overview of key words. After the paper title you indicated, include the summary and key words in the Serbian language, whereas they should be indicated in English like above.

Numbered subtitles of the first level must be formatted using the font 12 pt bold, a second-level sub-titles should be 10 pt bold. The text, and a list of references should be formatted using the font 10 pt.

3. Graphs, tables and formulae

All illustrations, regardless of whether they are diagrams, photographs or charts are referred to as images. The name and number of images should be displayed as centred.

Figure 1: Accommodation units according to the structure of hotel capacities in 2011 and 2012, written in the form of percentage



Source: (The Ministry of Finance and Economy, 2013)

The title and number of the table should be presented above the table as centred

Table 1: Accommodation units according to the structure of hotel capacities in 2011 and 2012, written in the form of percentage

Category	**2011**	**2012**	**Number of accommodation units (2011)**	**Number of accommodation units (2012)**
5*	**9,9**	**6,7**	1452	990
4*	**23,6**	**25,9**	3486	3911
3*	**39,8**	**37,3**	5895	5636
2*	**21,2**	**22,6**	3102	3420
1*	**5,6**	**7,5**	1133	1132
total	100	100	15068	15089

Source: (The Ministry of Finance and Economy, 2013)

Submit your article, including tables, images, etc., as a single file. In addition, you should submit all figures and tables (which are entered in black and white) as separate files in TIFF or JPF format with a minimum resolution of 300dpi.

Formulae should be centered on the page and properly numbered, as in the following example. It is recommended that you format the rows with formulae in Microsoft Word (using MathType).

$$PVo = \frac{FVn}{(1+i)^n} \tag{1}$$

4. Conclusion

In conclusion, the authors should summarize the results they have obtained in the research.

5. Literature

When quoting the literature, the APA referencing system should be used. For more information, see the Publication Manual of the American Psychological Association (6th ed.).

When quoting within the text, as in the sentence where you mention the author and specify his words, then after the author's name you should indicate the year of publication of the quoted text in parentheses, at the end of the sentence there should be the number of page in which the text should be indicated: according to Čerović (2012) „quoted text''(p.10). When the author is not mentioned in the sentence, then his last name, the year of publication and the number of page should be indicated in parentheses at the end of a sentence, and if the quote was created by paraphrasing or summarizing, then data about the page number is not required: (Čerović, 2012). If there are two or more references by the same author, but they were published at the same time in the same year, the referencing should look like this (Harish, 2008a; Harish, 2008b). When two authors wrote the paper together, the surnames of both authors are written as follows (Petković and Pindžo, 2012), or (Tew & Barbieri, 2012). The call for references in the text requires working with more than two authors and should be stated as follows (Luque-Martinez et al., 2007). When citing a source that does not show the number of pages (such as electronic sources) use the author's name and year of publication if the author is known, and if the author is a corporation or an organization, write down the organization name and year of publication (Ministry of Finance and Economy, 2013).

References should be given at the end of the main text in alphabetical order, following the last name of the author. Below are shown examples of using APA style for citations appearing in various forms (books, journal articles, proceedings, electronic resources, etc.).

A book with one author:
Example: Hrabovski, Tomić, E. (2009). *Health tourism destinations.* Novi Sad: Prometheus.

A book with several authors:
When you have multiple authors, all of them are supposed to be mentioned, but as soon as the last surnames are added and if there are more than seven authors, mention the first six and then write … at the end of the last author.

Example: Barrows, C. & W. Powers, T. (2009). *Introduction to the Hospitality Industry.* 7th edition. Hoboken, New Jersey: John Wiley & Sons, Inc.

A book which was translated from a foreign language:
Example: Spic, E. H. (2011). *Art and psyche: a study of psychoanalysis and aesthetics.* (A. Niksic, prev.). Belgrade: Clio.

A book with an editor for a collection of papers; proceedings:
If the book is a collection of papers on the appropriate topic, the authors should mention the editor of their work with the surname and first initial in parentheses as they add "edit" if the person is editor, or "Ed." as editor if the book is written in a foreign language.

Example: Đurković, M. (ed.) (2007). *Serbia 2000-2006: state, society, economy, Belgrade:* Institute for European Studies.

Papers in the proceedings:
Example: Cerovic, S. (2012). *Modern concepts of strategic tourism destination management.* Scientific conference with international participation "Tourism: Challenges and Opportunities", Trebinje.

Papers published in the journal by one author:
Example: Harish, R. (2008). Brand Architecture and its Application in Strategic Marketing. *The Icfai University Journal of Brand Management,* 7 (2), 39-51.

Papers in a journal with two authors:
If the article to which you refer has a DOI number, references need to be added.

Example: Tew, C. Barbieri, C. (2012). The perceived benefits of agritourism: The provider's perspective. *Tourism Management*, 33 (6), 215-224. doi: 10.1016 / j.tourman.2011.02.005

Papers in a journal with more than two authors:
Example: Luque-Martinez, T. Castaneda-Garcia, A. J., Frias-Jamilena, D. M., Munoz-Leiva, F. & Rodriguez-Molina, M. A. (2007). Determinants of the Use of the Internet as a Tourist Information Source. *The Service Industries Journal*, 27 (7), 881 to 891. doi: 10.1080 / 02642060701570586

Newspaper article with the aforementioned author:
Example: Muscle, M. (days 1 February 2012). US Steel has reduced its losses. *Politika,* p. 11

Newspaper article with no author specified:
Example: Straževica ready in two months. (Days 1 February 2012). *Politika,* p. 10

Thesis in the printed version:
Example: Dewstow, R. A. (2006). *Using the Internet to enhance teaching at the University of Waikato* (Unpublished master's thesis). University of Waikato, Hamilton, New Zealand.

Document or database from the Internet, the private or official web page for which we know the database author:
Example: Kraizer, S. (2012). Safe child. Retrieved on 29 October 2012, from http://www.safechild.org/

Document or databases from the Internet, the official web page for which we do not know the author:
Example: Penn State Myths. (2006). Retrieved December 6, 2011, from http://www.psu.edu/ur/about/myths.html

Document or databases from the Internet, private or official web page where the author is a corporation or organization:
For example, the Ministry of Finance and Economy. (2013). Information on tourist traffic in Serbia. Retrieved on 06 February 2013 from http://www.turizam.mfp.gov.rs/index.php/sr/2010- 02-11-17-24-30

The sources which were not used in the paper should not be included in the list of references. References should be cited in the language in which they are published without translating them into the language of paper.

Obrazac za pripremu radova za objavljivanje u časopisu
Serbian Journal of Engineering Management

Naslov rada na srpskom jeziku

Ime Prezime[3]*, Ime Prezime[2], Ime Prezime[3] [ostavite u ovoj verziji prazno za potrebe recenzije]

[1] Institucija i i-mejl adresa [ostavite u ovoj verziji prazno za potrebe recenzije]
[2] Institucija i i-mejl adresa [ostavite u ovoj verziji prazno za potrebe recenzije]
[3] Institucija i i-mejl adresa [ostavite u ovoj verziji prazno za potrebe recenzije]

Apstrakt: Ovaj dokument predstavlja obrazac za formatiranje radova tako da izgledaju kao da su već spremni za štampu. Sažetak predstavlja kratak informativni prikaz sadržaja članka koju čitaocu treba da omogući brzu i tačnu ocenu njegove relevantnosti. Autori treba da obrazlože ciljeve istraživanja ili navedu razlog (razloge) zbog koga pišu članak. Zatim, potrebno je da opišu metode korišćene u istraživanju i ukratko opišu rezultate do kojih su došli u istraživanju. Sažetak treba da sadrži od 100 do 250 reči.

Ključne reči: 3-5 ključnih reči za indeksiranje i pretraživanje

Title of Paper in English

Abstract: This document presents a template for preparing the print-ready papers that will be included in the Serbian Journal of Engineering Managment. The abstract briefly summarizes the article and gives the reader the opportunity to assess it's relevancy. The authors should elaborate the goals of the research or state their reason (reasons) for writing the paper. It is additionally required for them to describe the methods used during the research and give a brief description of the results and conclusions of the research. The abstract should be between 100 and 250 words in lenght.

Keywords: 3-5 keywords

1. Uvod

Rad pisati koristeći MS Word za Windows (tastatura za srpsku ćirilicu, latinicu ili engleski jezik - UK). Dužina rada treba da bude najviše 10 strana uključujući tekst, slike, tabele, literaturu i ostale priloge. Format stranice je **A4.** Koristite **2 cm** za donju i gornju marginu, a **2,5 cm** za levu i desnu marginu. Razmak između redova u okviru jednog pasusa je jedan, dok je razmak između paragrafa dvostruki. Za formatiranje teksta preporučuje se korišćenje fonta **Times New Roman.**

2. Struktura rada

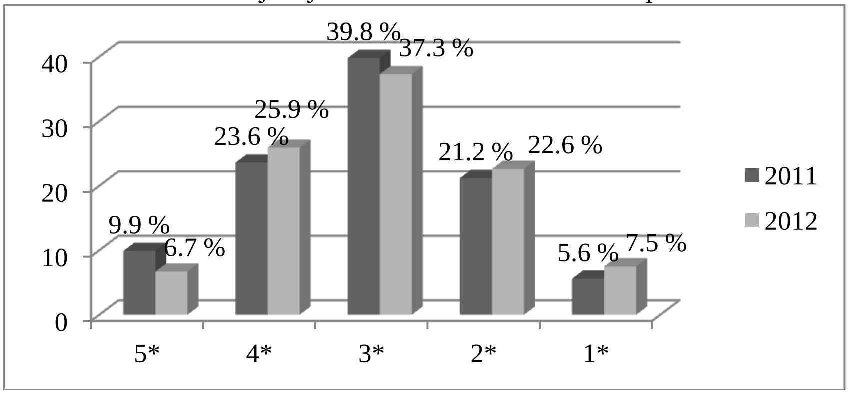
U prvom redu na prvoj strani treba napisati naslov rada na srpskom jeziku (16 pt). Ispod naslova rada treba ostaviti mesto za navođenje ime(na) autora, nazive institucija autora onako kako je naznačeno u ovom Obrascu. Nakon institucije poslednjeg autora, ostaviti jedan prazan red i u sledećem napisati kratak sažetak (10 pt). Nakon sažetka sledi pregled ključnih reči. Nakon prikazanog naslova rada, sažetka i ključnih reči na srpskom jeziku, potrebno je i na engleskom jeziku naznačiti prethodno navedeno.

Numerisane podnaslove prvog nivoa treba formatirati korišćenjem fonta 12 pt boldovano, a podnaslove drugog nivoa 10 pt boldovano. Tekst, kao i spisak literature treba formatirati korišćenjem fonta 10 pt.

3. Grafički i tabelarni prikazi i formule

Sve ilustracije, bez obzira da li su dijagrami, fotografije, grafikoni nazivaju se slike. Naziv i broj slike treba prikazati na sredini reda iznad slike.

Slika 1: Procentualno učešće smeštajnih jedinica u strukturi hotelskih kapaciteta u 2011. i 2012. godini



Izvor: (Ministarstvo finansija i privrede, 2013)

Naziv i broj tabele treba prikazati iznad tabele na sredini reda.

Tabela 1: Procentualno učešće smeštajnih jedinica u strukturi hotelskih kapaciteta u 2011. i 2012. godini

Kategorija	**2011.**	**2012.**	**Broj smeštajnih jedinica (2011)**	**Broj smeštajnih jedinica (2012)**
5*	**9,9**	**6,7**	1452	990
4*	**23,6**	**25,9**	3486	3911
3*	**39,8**	**37,3**	5895	5636
2*	**21,2**	**22,6**	3102	3420
1*	**5,6**	**7,5**	1133	1132
ukupno	100	100	15068	15089

Izvor: (Ministarstvo finansija i privrede, 2013)

Pošaljite svoj rad, uključujući tabele, slike itd, kao jednu datoteku. Pored toga, treba dostaviti sve slike i tabele (koje se unose u crno-beloj tehnici) kao posebne fajlove u JPF ili TIFF formatu sa najmanje 300dpi rezolucije.

Formule treba centrirati na stranici sa numeracijom, kao u narednom primeru. Preporučuje se formatiranje redova sa formulama u Microsoft Word-u (MathType).

$$\mathrm{PVo} = \frac{\mathrm{FVn}}{(1+\mathrm{i})^{\mathrm{n}}} \qquad (1)$$

4. Zaključak

U zaključku autori treba da sumiraju rezultate do kojih su došli u istraživanju.

Literatura

Prilikom navođenja literature, treba se pridržavati uputstva APA sistema navođenja literature. Za više informacija pogledajte *Publication Manual of the American Psychological Association* (6th ed.).

Prilikom citiranja unutar teksta, kada u rečenici spominjete autora i navodite njegove reči, onda posle imena autora treba navesti godinu izdanja citiranog teksta u zagradi, a na kraju rečenice potrebno je navesti broj strane na kojoj se nalazi rečenica u tekstu iz koga navodite: prema Čeroviću (2012), „citirani tekst“ (str.10). Kada se autor ne spominje u rečenici onda njegovo prezime, godinu izdanja rada i broj strane u radu navesti u zagradi i na kraj rečenice, a ako je citat nastao parafraziranjem ili rezimiranjem, onda podatak o broju strane nije neophodan: (Čerović, 2012). Ukoliko se navodi dve ili više referenci istog autora, a pri tom su objavljene u istoj godini, poziv na reference treba navesti na sledeći način (Harish, 2008a; Harish, 2008b). Kada su dva autora rada, navode se prezimena oba autora na sledeći način (Petković i Pindžo, 2012), odnosno (Tew & Barbieri, 2012). Poziv na reference u tekstu za radove sa više od dva autora treba navesti na sledeći način (Luque-Martinez i sar., 2007). Kada citirate izvor koji ne prikazuje broj strana (kao što su elektronski izvori) koristite prezime autora i godinu objavljivanja, ukoliko je autor poznat, a ukoliko je autor korporacija ili organizacija, naziv organizacije i godinu objavljivanja (Ministarstvo finansija i privrede, 2013).

Reference treba navesti zajedno na kraju glavnog teksta azbučnim redom po prezimenu autora. U nastavku su prikazani primeri korišćenja APA stila za citiranje u raznim oblicima pojavljivanja (knjiga, rad u časopisu, zbornik, elektronski izvori itd.).

Knjiga sa jednim autorom:
Primer: Hrabovski, Tomić, E. (2009). *Destinacije zdravstvenog turizma.* Novi Sad: Prometej.

Knjiga sa više autora:
Kada imamo više autora navodimo ih sve, s tim što pre poslednjeg prezimena dodajemo i, odnosno &, ako imamo više od sedam autora, navodimo prvih šest, zatim pišemo pišemo tri tačke, i na kraju poslednjeg autora.

Primer: Barrows, C. W. & Powers, T. (2009). *Introduction to the Hospitality Industry*. 7th edition. Hoboken, New Jersey: John Wiley&Sons, Inc.

Knjiga, prevod dela:
Primer: Spic, E. H. (2011). *Umetnost i psiha: studija o psihoanalizi i estetici.* (A. Nikšić, prev.). Beograd: Clio.

Knjiga sa urednikom ili priređivačem, zbornik radova:
Ako je knjiga zbornik radova na neku odgovarajuću temu, kao autora navodimo priređivača tog dela i uz njegovo prezime i inicijal imena u zagradi dodajemo "ured." ako je urednik, ili "prir." ako je priređivač, ili pak "Ed." kao editor ako je knjiga pisana na stranom jeziku.

Primer: Đurković, M. (ured.) (2007). *Srbija 2000-2006: država, društvo, privreda, Beograd:* Institut za evropske studije.

Rad u zborniku radova:
Primer: Čerović, S. (2012). *Savremeni koncepti strategijskog upravljanja turističkom destinacijom.* Naučni skup sa međunarodnim učešćem "Turizam: izazovi i mogućnosti", Trebinje.

Rad u časopisu sa jednim autorom:
Primer: Harish, R. (2008). Brand Architecture and its Application in Strategic Marketing. *The Icfai University Journal of Brand Management,* 7(2), 39-51.

Rad u časopisu sa dva autora:
Ako članak na koji se pozivate ima DOI broj, treba ga dodati referenci.

Primer: Tew, C. & Barbieri, C. (2012). The perceived benefits of agritourism: The provider's perspective. *Tourism Management,* 33(6), 215-224. doi:10.1016/j.tourman.2011.02.005

Rad u časopisu sa više od dva autora:
Primer: Luque-Martinez, T., Castaneda-Garcia, J. A., Frias-Jamilena, D. M., Munoz-Leiva, F. & Rodriguez-Molina, M. A. (2007). Determinants of the Use of the Internet as a Tourist Information Source. *The Service Industries Journal,* 27(7), 881-891. doi: 10.1080/02642060701570586

Članak iz novina sa navedenim autorom:
Primer: Mišić, M. (1. feb. 2012). Ju-es stil smanjio gubitke. *Politika,* str. 11.

Članak iz novina bez navedenog autora:
Primer: Straževica gotova za dva meseca. (1. feb. 2012). *Politika,* str. 10.

Teza-štampana verzija:
Primer: Dewstow, R. A. (2006). *Using the Internet to enhance teaching at the University of Waikato* (Unpublished master's thesis). University of Waikato, Hamilton, New Zealand.

Dokumenta ili baze podataka sa interneta, privatne ili zvanične internet stranice kojima se zna autor:

Primer: Kraizer, S. (2012). *Safe child*. preuzeto 29. oktobra 2012, sa http://www.safechild.org/

Dokumenta ili baze podataka sa interneta, zvanične internet stranice kojima se ne zna autor:
Primer: *Penn State Myths*. (2006). Preuzeto 6. decembra 2011, sa http://www.psu.edu/ur/about/myths.html

Dokumenta ili baze podataka sa interneta, privatne ili zvanične internet stranice kojima je autor korporacija ili organizacija:
Primer: Ministarstvo finansija i privrede. (2013). *Informacije o turističkom prometu u Srbiji*. preuzeto 06. februara 2013. sa http://www.turizam.mfp.gov.rs/index.php/sr/2010-02-11-17-24-30

Izvori koji nisu korišćeni u radu ne treba da se nalaze u popisu literature. Reference treba navoditi na jeziku na kome su objavljene bez prevođenja na jezik rada.

Instructions for Authors

The Journal Committee strives to maintain the highest academic standards. The submitted papers should be original and unpublished until now. Also, it is forbidden that papers are in the process of reviewing in some other publication.

The papers would be subjected to check. The paper should fit the outlined academic and technical requirements.

Paper Types

Original unpublished scientific paper:
- Original scientific paper;
- Plenary lecture and paper presented at the conference;
- Review paper;
- Scientific review; discussion.

Original unpublished professional paper:
- Original professional paper;
- Contribution
- Book review.

Papers may be written in Serbian and English for authors from Serbia and the region or English for authors from other countries.

Submitted papers must be in alignment with guidelines for authors. In case they have not followed these guidelines, they would be reviewed for correction.

All manuscripts are subject to *double blind review*, i.e. the process of double "blind" anonymous reviewing. The papers must not contain any references which may indicate the author(s).

Paper Submission

Authors should send their papers via email casopis@fim.rs in .doc or .docx format.

The application consists of two separate attachments:
- Attachment 1, which contains the following data: the title of paper, author's name (without professional title), institution and address (email, postal address, phone number), as well as the asterisk next to the author in charge of correspondence;
- Attachment 2, which contains the paper with the following elements: paper title, abstracts, key words, the middle part of the paper, tables, graphs, references and attachments.

Authors, who pass the *double blind* anonymous review, will receive the document called the Author's Statement of Originality, which will be filled in, underlined, scanned and sent to the email: casopis@fim.rs.

Paper content

All papers should contain: introduction, which elaborates on the aim and subject of the research, main hypothesis, work methods and paper structure; middle part of the paper where research is outlined (it is further divided into sub-headings) and conclusion, which represents summed up results and implications for further research.

Author's rights

After accepting the paper and signing up the Author's Statement of Originality, the author signs the statement according to the Author's Rights of the Journal.

Author's editions

Authors of published papers will receive one print version of the paper for their personal usage.

Paper submissions:

Papers should be submitted via email: casopis@fim.rs.

Uputstvo za autore

Uredništvo časopisa nastoji da održi visok akademski standard. Radovi, koji se podnose, treba da budu originalni i do sada neobjavljeni. Takođe, radovi ne smeju da se nalaze u postupku recenzije u nekom drugom časopisu. Radovi će biti podvrgnuti proveri. **Tekst rada mora da odgovara akademskim i tehničkim zahtevima.**

Tip rada

Originalni naučni rad, koji nije objavljen:

- Originalni naučni rad;
- Plenarno predavanje i rad prezentovan na konferenciji;
- Pregledni rad;
- Naučna kritika, odnosno polemika.

Originalni stručni rad, koji nije objavljen:

- Stručni rad;
- Informativni prilog;
- Prikaz knjige.

Jezici radova mogu biti srpski i engleski za autore iz Srbije i engleski za autore sa drugih govornih područja.

Podneti radovi moraju biti usaglašeni sa uputstvom za autore. U slučaju da nisu usaglašeni, biće vraćeni na ispravljanje.

Svi rukopisi podležu tzv. *double blind* recenziji, odnosno procesu dvostruko „slepe“, anonimne recenzije. Tekst rada ne sme da sadrži bilo kakve reference koje mogu da ukažu na autora/e rada.

Prijava radova

Autori treba da pošalju svoje radove elektronski, putem i-mejla casopis@fim.rs u vidu priloga u .doc ili .docx formatu.

Prijava se sastoji iz dva odvojena priloga:

- Prilog 1, koji sadrži sledeće podatke: naslov rada, imena autora (bez titula i zvanja), institucija/e i adresa/e (i-mejl, poštanska adresa, broj telefona), kao i zvezdicu kod imena autora koji je zadužen za korespondenciju;
- Prilog 2, koji sadrži rad sa sledećim elementima: naslov rada, apstrakt/i, ključne reči, središnji deo rada, slike, tabele, grafikoni, reference, prilozi;

Autorima, koji prođu dvostruko anonimnu recenziju, biće poslat dokument Izjave autora o originalnosti rada, koji će popuniti, potpisati, skenirati i poslati na i-mejl casopis@fim.rs.

Sadržaj rada

Svi rukopisi treba da sadrže: uvod, koji čine cilj i predmet istraživanja, osnovna hipoteza, metode rada i struktura rada; središnji deo rada u kome se prikazuje istraživanje (dalje podeljen na potpoglavlja) i zaključak, koji predstavlja sumiranje rezultata istraživanja kao i implikacije za dalja istraživanja.

Autorska prava

Po prihvatanju rada i potpisivanje izjave o originalnosti, autor potpisuje izjavu kojom prenosi autorska prava na Časopis.

Autorski primerci

Autori publikovanih radova će dobiti primerak štampane verzije časopisa za lično korišćenje.

Dostavljanje radova:

Radovi se dostavljaju putem i-mejla casopis@fim.rs.

List of Reviewers/Spisak recenzenata

Prof. dr Ajda Fošner, Slovenia
Prof. dr Ana Jurčić, Serbia
Prof. dr Bljerim Haljilji, Serbia
Prof. dr Dušan Borić, United Kingdom
Prof. dr Duško Tomić, UAE
Prof. dr Ioan Bacivarov, Romania
Prof. dr Jasna Brujić, USA
Prof. dr Jelena Buha, Switzerland
Prof. dr Karmen Erjavec, Slovenia
Prof. dr Marija Najdić, Serbia
Prof. dr Marios Panagiotis Efthymiopoulos, UAE
Prof. dr Milica Gerasimović, Serbia
Prof. dr Mirjana Kranjac, Serbia
Prof. dr Nehat Madžuni, Serbia
Prof. dr Sanja Jevtić, Serbia
Prof. dr Simon Muhič, Slovenia
Prof. dr Slađan Milosavljević, Serbia
Prof. dr Slobodan Vasović, Serbia
Prof. dr Slobodan Živković, Serbia
Prof. dr Srđan Tomić, Serbia
Prof. dr Tatjana Ilić, UAE
Prof. dr Vladica Stojanović, Serbia
Prof. dr Zlatko Langović, Serbia
Prof. dr Hatidža Beriša, Serbia
Prof. dr Nikolina Ljepava, UAE
Prof. dr Proda Šećerov, Serbia
Prof. dr Eldar Šaljić, UAE
Doc. dr Dejan Milenković, Serbia
Doc. dr Dejan Viduka, Serbia
Doc. dr Igor Zorić, Serbia
Doc. dr Ivona Zenović, Serbia
Doc. dr Jasmina Đurašković, Serbia
Doc. dr Marina Letonja, Slovenia
Doc. dr Mina Jovanović, Serbia
Doc. dr Mirjana Stevanović, Serbia
Doc. dr Mitja Jeraj, Slovenia
Doc. dr Nemanja Maček, Serbia
Doc. dr Tanja Kranjac, Serbia
Doc dr Vladislav Krstić, Serbia

Editorial Board concluded this issue on July 15, 2022.
Uređivački odbor je zaključio ovaj broj 15. jula 2022.

ISSN: 2466-4693

Contact/Kontakt:
Serbian Journal of Engineering Management
Editorial Board/Uredništvo
School of Engineering Management/Fakultet za inženjerski menadžment
Bulevar vojvode Mišića 43
11000 Beograd
casopis@fim.rs
Tel. +381 11 41 40 425

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

005:62

SERBIAN Journal of Engineering Management /
glavni i odgovorni urednik Vladimir Tomašević. - Vol. 1, no. 1 (2016)- . - Beograd : Univerzitet "Union - Nikola Tesla", Fakultet za inženjerski menadžment, 2016- (Beograd : Draslar Partner). - 30 cm

Polugodišnje.
ISSN 2466-4693 = Serbian Journal of Engineering Management
COBISS.SR-ID 224544524