



Međunarodna naučna konferencija Univerziteta Singidunum
Singidunum University International Scientific Conference

Book of Proceedings

Singidunum University International Scientific Conference

PEOPLE IN THE CENTER OF PROCESS AUTOMATION



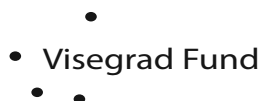
BOOK OF PROCEEDINGS

Singidunum University International Scientific Conference

PEOPLE IN THE CENTER OF PROCESS AUTOMATION



Publishing of Conference Proceedings of the International Scientific Conference of the People in the Center of Process Automation - FINIZ 2020 has been supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia.



The project is co-financed by the Governments of the Czech Republic, Hungary, Poland and Slovakia through Visegrad Grants from International Visegrad Fund. The mission of the fund is to advance ideas for sustainable regional cooperation in Central Europe.

Belgrade

December 4, 2020

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Singidunum University International Scientific Conference

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People in the Center of Process Automation

Publisher: Singidunum University, 32 Danijelova Street, Belgrade

For publisher: Milovan Stanišić

Publishing Editor: Svetlana Stanišić

Scientific Section Editors: Nemanja Stanišić,
Lidija Barjaktarović

Professional Section Editor: Zoran Petrović,
Goranka Knežević

Design: Aleksandar Mihajlović

Prepress: Miloš Višnjić

Year: 2020

Circulation: 60

Printed by: Caligraph, Belgrade

ISBN: 978-86-7912-737-2

Contact us

Singidunum University
32 Danijelova Street, Belgrade, 11010
Belgrade, Serbia
Phone. +381 11 3093220, +381 11 3093284
Fax. +381 11 3093294
E-mail: finiz@singidunum.ac.rs
Web: www.finiz.singidunum.ac.rs

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ABOUT FINIZ 2020 CONFERENCE

It is our great pleasure to introduce the proceedings of the international scientific FINIZ 2020 Conference, which is online on December 4, 2020. The main topic of this year's conference is: *"People in the Center of Automation Process"*.

Automation has been leading the way to industrial and scientific advancement for more than a century. The advancement has often been coupled with friction and ambiguity as to whether technology would replace human labor. The influx of new technology and the general application of intelligent automation across industries, sectors, and organizations is likely to trigger another wave of disruption. Even though anxiety and uncertainty naturally surround any change, placing people in the center of automation process is likely to enable us to use advanced practices to enhance people's abilities, raise quality of work and open new frontiers. This will provide people with more resources to focus on areas of work that need more attention. Automation enables process optimization that increases efficiencies and frees people from doing mundane tasks. Nevertheless, people remain an integral part of the process since automation enables them to enhance their performance.

The aim of this conference is to provide a multi-national platform where eminent scientists and experts will discuss how automation process enhances work outcomes in their fields of interest including tax, external audit, corporate governance, corporate finance, information decision support systems, banking, marketing and management, human resources and circular economy. Some authors have also been motivated to link their work to friction and ambiguity caused by the COVID-19 pandemic. The following sections outline how papers contribute to the process automation topic: tax issues related to the International Visegrad Fund project and thematic areas of conference (accounting, external audit, corporate governance, corporate finance, evaluation and risk, information decision support systems, banking, marketing and management, human resources, circular economy).



All the accepted papers have undergone a thorough review process, performed by the reputable members of the Conference Organizing and Scientific Committee.

The overall statistical data on the conference are as follows:

- The total number of submitted papers / abstracts: 38
- The total number of full papers submitted: 32
- The total number of accepted papers: 29
- The total number of rejected papers: 0
- The total number of withdrawn papers: 3

The number of papers according to their related field:

- Tax (9)
- Accounting (1)
- External Audit (1)
- Corporate Governance (3)
- Corporate Finance (1)
- Evaluation and Risk (1)
- Information Decision Support Systems (1)
- Banking (3)
- Marketing and Management (2)
- Human Resources (6)
- Circular Economy (1)

The total of 61 authors from 10 countries have taken part in this year's conference. The number of authors according to their country of origin: Armenia: 1, Bangladesh: 1, Bosnia and Herzegovina: 1, France: 1, Greece: 4, Oman: 2, Poland: 4, Serbia: 45, Turkey: 1, UK: 1.

All the accepted papers are published and made publicly available within the Conference portal. Each paper is assigned its DOI number, a reference on Google Scholar, and the Conference Proceedings have an ISBN number.

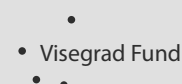
As Singidunum University is strongly committed to continuous enhancement of automation process across various areas, it will keep on promoting this issue among the scientific and general public with the aim of putting forward practical scientific and business solutions that could ensure long-term survival and sustainable growth of the corporate sector.

**Organizing Committee of the
International Scientific Conference FINIZ 2020**



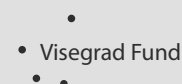
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INVITED PAPERS

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- **Visegrad Fund**
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ABOUT THE PROJECT

Project *Experience-sharing of Visegrad countries to tax avoidance activity* - has been launched on 1st October, 2020. The International Visegrad Fund finances the project (no. 22010083).

The first event of promoting the project is during the FINIZ 2020 conference, on 4th December. In accordance with it, there are two sessions related to the project. The first session is related to the open discussion between theory and practice with respectable professional experts in order to present legal ways to decrease the level of tax evasion. The second session is related to the presentations and speeches of project team members based on their articles which are part of this book of proceedings under the title *People in the Centre of Process Automation*.

Partners in the project are:

1. Wroclaw University of Economics and Business, Poland
2. Mendel University in Brno, Czech Republic
3. University of Prešov in Prešov, Slovakia
4. Singidunum University Belgrade, Republic of Serbia
5. University of Debrecen, Hungary
6. The College of Regional Development and Banking Institute - Ambis, a.s, Czech Republic
7. The Accountants Association in Poland Lower Silesian Branch, Poland

Short description of the project:

The project aims to share the experience of tax avoidance in Visegrad countries with academic staff and legal authorities from Serbia.

Examination of the issue of tax avoidance allows detecting tax burden transfer, which may be associated with organized crime and frauds. Partners from the Czech Republic, Poland, Hungary and Serbia will present the experience regarding tax avoidance based on the methodology prepared by the Slovak partner.

Partners will prepare the final product of the grant - the publication of the best practices concerning tax avoidance in V4 countries + Serbia. The papers will present the direction for law adjustment and the influence of tax avoidance on social responsibility policy.

Duration: 1/10/2020 - 31/3/2021

Acknowledgement:

The project is co-financed by the Governments of the Czech Republic, Hungary, Poland and Slovakia through Visegrad Grants from the International Visegrad Fund. The mission of the fund is to advance ideas for sustainable regional cooperation in Central Europe.

More information about the project on its **website:** <https://visegrad.ue.wroc.pl>

ABOUT CONFERENCE PAPERS RELATED TO THE PROJECT

There are 8 research papers related to the project financed by the Visegrad International Fund (three invited papers and five papers in the segment referring to a section of the Project), meaning that it is an interesting topic to various stakeholders.

The first invited paper titled *Tax avoidance in V4 countries and Serbia – influence of the company size on effective tax rate*, aims to examine company's size impact on the effective tax rate (ETR) in the Visegrad Group countries and Serbia. The research hypothesis suggests a positive relationship between company size and ETR, which is in line with the political power theory (PPT). This means that greater tax burdens are transferred to larger companies. The research hypothesis was verified by using regression models. The results indicate that there is a negative correlation between company size and ETR in Poland, Slovakia, and Hungary. The conclusions are consistent with the political cost theory (PCT), which may indicate that large companies have the tools to lower the tax burden in developing countries. In 2018 and 2017, there was no statistically significant correlation between the size of the companies and ETR in the Czech Republic and Serbia. In addition, it was noted that the companies from Hungary and Serbia using IFRS contributed to lowering the ETR.



• Visegrad Fund

The second invited paper titled *Does tax evasion significantly contribute to overall economic crime in Serbia?*, shows that the number of individuals prosecuted for tax evasion contributed with 28.67% of total prosecuted economic crime acts in 2014, and then it rose to 57.45% in 2018. Implying that the tax modernization project, which has been covering the period from 2018 to 2023, is of great importance.

The third invited paper is titled *Tax evasion, prevention measures and detection procedures – the case of the Republic of Serbia*. It offers the following as its main findings resulting from the research conducted in 2019: 1) the majority of respondents were aware of TE, 2) working illegally was the most common way of TE, 3) the majority of respondents said that they hadn't received a bill after every purchase, 4) all respondents emphasized that some party should be penalized for not getting the bill after purchase, 5) the majority of respondents answered that adequate tax propaganda was the way of educating taxpayers, 6) the majority of respondents would not report any notice of any form of TE. The state and tax authorities should take measures in order to create a win-win climate for all stakeholders in order to reduce TE.

Other researchers were interested in the following: the Effective tax rate in V4 countries and Serbia - sectoral approach; using Benford's law to detect tax evasion in micro-enterprises in Serbia; corporate tax reporting related to the Serbian public companies; factors influencing the tax mentality of an average taxpayer in Poland; risk analysis as a fundamental element of the capital group's transfer pricing policy; and factors influencing the tax mentality of an average taxpayer in Poland.

Researchers of the paper *The Effective tax rate in V4 countries and Serbia - sectoral approach* investigated whether there were any positive relationships between the size of the companies (LNA) and the effective tax rate in individual sectors of economic activity in Visegrad countries and Serbia. The Political Cost Theory could explain a positive relationship. The analysis was carried out using regression analysis for individual sectors (BvD sector classification) and countries. The results indicate that there is a need for further research and extension to new reporting periods and variables.

The subject matter of the paper titled *Using Benford's law to detect tax evasion in micro-enterprises in Serbia* was to analyse the tax evasion by micro-enterprises in Serbia in respect of income tax. By applying Benford's law, the authors would empirically determine the degree of authenticity of the revenues disclosed by micro-enterprises in their financial statements and whether the tax base to which income tax was paid was disclosed realistically. The research was conducted on a sample of 45 micro-companies and analysis of their financial statements for the period from 2017 to 2019. The research results show that micro-enterprises in Serbia, for the most part, disclose their net income realistically and in accordance with Benford's law, meaning they do not show the tendency to underestimate their income with the aim to pay lower taxes or avoid paying them entirely, however, the worrying results were obtained when the operating profit was tested. The findings of that research may yield great benefits both to auditors and tax authorities.

The main purpose of the paper titled *Corporate tax reporting: Effective tax rate of Serbian public entities* was to analyse the correlation between financial (accounting) result in an income statement and tax result in a tax report. The calculation of corporate income tax expense is a complex procedure which requires the use of legal tax regulations. As a result, legal entities could report profit in their financial statements, while not having the income tax expense at the same time. Research sample consisted of a randomly selected 322 business entities and their annual reports from the Belgrade Stock Exchange from 2017. The results of the research show that the average effective tax rate of sample entities is app. 12%, while median is app. 9%.

The paper titled *Risk analysis as a fundamental element of the capital group's transfer pricing policy* presents the risk analysis of transactions concluded between related entities as an essential element of the capital group's transfer pricing policy. Risk has been presented as a phenomenon that occurs in every business activity. The importance of its identification for making both operational and strategic decisions by related entities was pointed out. Attention was paid to the significance of verification of potential areas determining the risk in question and ways to limit it.



In addition, elements of transfer pricing policy were presented which should be followed by related entities limiting the negative effects of risk. It was emphasized that creating a transfer pricing policy in the capital group and knowledge of certain tax tools was only a starting point for their proper application, which depended on the assumed goals of the group of related entities and the conditions under which transactions were carried out.

The main objective of the study titled *Risk analysis as a fundamental element of the capital group's transfer pricing policy* was to evaluate the impact of specific elements of the tax environment upon the tax mentality of an average taxpaying natural person in Poland. For this purpose, the author identified four platforms for the analytical evaluation of tax compliance, namely: normative, organizational, economic, and psychological. The concept of tax mentality was defined and followed by determination of factors that may potentially influence it. The study employed the following research methods: literature analyses and studies, statistical methods, thought experiment, diagnostic poll. The research problem was constructed on the sound foundation of available sources and published research results, both domestic and foreign. The paper presented detailed analyses and conclusions derived from a pilot study designed and conducted by the author.

It can be concluded that the topic of the Project is in the focus of all countries which are a part of the Project and wider. The authors of presented papers hope that their research will have some impact on further steps of their states in order to minimize tax avoidance.

The Project topic was of interest to the student of Singidunum University, who prepared own article under thematic area Tax related to the forms of manifestation and measures of suppression in Montenegro. The subject of the research titled *Tax evasion in Montenegro, forms of manifestation and measures of suppression* is encouraged by the states' initiative "Be responsible, it depends on you. Grey economy 0%". When Montenegro became an independent state, the main goals were enabling tax policy to function in a way that would meet the standards of the European Union and enabling the state to become financially stable. The business strategies of the Tax Administration refer to zero tolerance rate to the grey economy and the application of a rigorous penal policy. A very important determinant of tax payment is tax morale - how much the taxpayer is willing to pay taxes voluntarily. The citizens of Montenegro are also involved in the fight against the grey economy through the application of "Be responsible, it depends on you. Grey economy 0%", through which the citizens report irregularities in the field of grey economy. In the last five years, this project has shown very good results, a large number of fines have been imposed and half of the fines have been invested in projects of social importance.



TAX AVOIDANCE IN V4 COUNTRIES AND SERBIA – INFLUENCE OF COMPANY SIZE ON EFFECTIVE TAX RATE

Piotr Luty

Wroclaw University of
Economics and Business,
Wroclaw, Poland

Abstract:

The article aimed to check company size's impact on the effective tax rate (ETR) in the Visegrad Group countries and Serbia. The research hypothesis suggested a positive relationship between company size and ETR, in line with the political power theory (PPT). This means that greater tax burdens are transferred to larger companies. The research hypothesis was verified with the use of regression models. The results indicate that in Poland, Slovakia, and Hungary, there was a negative correlation between company size and ETR. The conclusions are consistent with the political cost theory (PCT). This may indicate that in developing countries large companies have the tools to lower the tax burden. In 2018 and 2017, there was no statistically significant correlation between the size of the companies and ETR in the Czech Republic and Serbia. Additionally, it was noted that the companies from Hungary and Serbia use IFRS contributed to lowering the ETR.

Keywords:

Visegrad, tax avoidance, effective tax rate.

1. INTRODUCTION AND HYPOTHESIS DEVELOPMENT

Paying taxes is inevitable in running a business. From the perspective of the country, it is an essential element in finalizing the state budget. However, tax burden should be correctly calculated not to be an excessive burden for companies and hinder their development. There is often the reluctance to pay taxes in practice, and the problem of tax avoidance has been noticed by many researchers (Kovermann 2019, Belz, et al. 2019). Based on the review of 79 scientific publications from 2006-2018 in tax avoidance (Kovermann 2019), it can be concluded that the research covered companies from highly developed countries in most cases. Based on the analysis of scientific studies (Kovermann 2019 a), it can be concluded that European countries were not at the center of interest in tax avoidance research. Out of 79 quoted studies, only three concerned European countries. It is also noticeable that the conducted research is outdated because, in the cited 79 publications (Kovermann 2019), research samples in most cases ended in 2011. The problem of outdated research results is also confirmed in other publications (Akhtar et al. 2017). Based on the research (Thomsen, Watrin 2018), it is concluded that companies from the United States do not avoid taxes to a greater extent than companies from the 12 largest European countries. The study of these authors was limited by the selection of only the largest European countries. There were no smaller countries in the study, including the countries of Central and Eastern Europe.

The hypotheses verification takes place mainly with quantitative variables (Richardson 2007, Akhtar et al. 2019). An in-depth analysis of American companies was also carried out by Dyreng et al. (2017).

Correspondence:
Piotr Luty

e-mail:
piotr.luty@ue.wroc.pl



The study results by Dyreng et al. (2017) indicate that international companies did not lower the effective tax rate more than domestic companies.

Many factors contribute to lowering the effective tax rate. It can be concluded that there is no one universal set of factors that would explain the phenomenon of tax avoidance. In different political or economic environments, they will be activated with different intensities of tax avoidance behaviors. The complexity and multifaceted nature of tax avoidance are presented in the research by Badertscher et al. (2013) in terms of the ownership structure's impact. Badertscher et al. (2013) indicate that in companies where the owners influence the company's current affairs, the tax avoidance phenomenon is low. A family business is a particular case of companies in which the ownership and managerial functions are closely related. Mafrolla and D'Amico (2016), Gaaya et al. (2017) come to different conclusions than Badertscher et al. (2013) and indicate that in family companies, there is a greater propensity to avoid taxation.

The analysis of the literature shows the use of various methods of estimating the effective tax rate. The most common methods are using paid corporate income tax (Cash ETR) or tax expense from the profit and loss account (Kovermann 2019). The use of the tax burden from the profit and loss account is related to accepting high-quality accounting procedures. The financial statements' quality is confirmed by the fact that statutory auditors audit the financial statements. There are studies in bibliography showing the impact of selecting an audit company on tax avoidance. In the studies of Kanagaretnam et al. (2016) and Richardson et al. (2013) and Gaaya al. (2017), it is indicated that the selection of certified auditor from "BIG 4" reduces tax avoidance. Choosing an auditor from "BIG 4" is associated with higher costs of auditing financial statements. The research by Hogan, Noga (2015), or Apostol, Pop (2019) shows a positive relationship between the costs of legal and tax services and tax avoidance.

Due to their function in creating the state budget, tax burdens are controlled by various tax administration bodies. Tax administration bodies introduce various methods of monitoring budget revenues. Kubick et al. (2016), Jiménez-Angueira (2018) studied the impact of internal and external monitoring of tax burdens on the phenomenon of tax avoidance.

In the literature, there is often a relationship between tax avoidance and company size. According to the Political Cost Theory (PCT), large companies are more exposed to state action to increase their tax burden. Beltz et al. (2019) indicate that large companies may be subject to additional regulations and that large companies may be forced to undertake increased social responsibility activities. According to PCT, there is a positive relationship between the size of the companies and the ETR.

The second theory describing the relationship between companies' size and the effective tax rate is Political Power Theory (PPT). In line with this theory, it is noted that large companies can influence on political decisions, for example, in the regulation of tax burdens (Beltz et al. (2019)). As a consequence, large companies may present a lower tax burden. The literature also indicates (Beltz et al. (2019)) that the tax burden's sensitivity to political decisions may pertain to selected sectors of economic activity.

Discrepancies in the research results on the effective tax rate indicate the existence of a research gap. The article discusses the impact of the accounting system and companies' size on the number of tax burdens following the PPT. Therefore, a research hypothesis can be made:

H1: There is a positive correlation between ETR and company size.

H2: There is a positive correlation between the use of IFRS and the amount of ETR.

2. RESEARCH SAMPLE AND METHODOLOGY

The research sample includes companies from the Visegrad countries (Czech Republic, Poland, Slovakia, Hungary) and Serbia. The choice of the research sample results from the minimal publications on the issue of tax avoidance in Central and Eastern Europe, as well as Serbia. Additionally, the selection of the research sample is influenced by the scope of the IVF grant number 22010083.

The research covers two years: 2017 and 2018. The choice of research periods is based on the availability of financial data, at the time of preparing this paper (September 2020), companies should have approved and published financial statements for 2018. Theoretically, there may still be companies that do not have the approved and published financial statements for 2019 in September 2020. The article presents a pilot study that will be continued in the future.

It will be used in the research on the BvD Orbis database. During the preparation of the research sample, the following search criteria were used:

1. Status - active companies
2. World region / Country / Region in country - Czech Republic, Hungary, Poland, Serbia, Slovakia
3. Accounting practice - IFRS, Local GAAP
4. Total assets (m USD) - min = 0, 2018, 2017, 2016, 2015, 2014, for all the selected periods, exclusion of companies with no recent financial data and Public authorities / States / Governments
5. Taxation (m USD) - min = 0, 2018, 2017, 2016, 2015, 2014, for all the selected periods, exclusion of companies with no recent financial data and Public authorities / States / Governments



6. P / L before tax (m USD) - min = 0, 2018, 2017, 2016, 2015, 2014, for all the selected periods, exclusion of companies with no recent financial data and Public authorities / States / Governments
7. Size classification - Large, Medium, Very large

Based on the criteria used, companies were active and came from the Visegrad Group countries and Serbia. Additionally, these companies disclosed tax burdens in the profit and loss account, and their total assets were greater than 0. In the study, the research sample includes medium, large, and very large companies. This assumption stems from the wagered research hypothesis, which will check the relationship between companies' size and the tax burden on the PPT theory. The initial research sample covers 65,376 companies, as shown in Table 1.

Table 1. Initial research sample

Country	number
CZ	14452
HU	21035
PL	15292
RS	5355
SK	9242
total	65376

Source: own study

The next stage is the elimination of companies from the financial and banking sector. This sector, due to specific conditions and regulations, may give incomparable results. Companies without being assigned to the economic activity classification were also removed from the database. Table 2 shows the numbers of companies using additional criteria.

Table 2. Research sample – elimination from the financial and banking sector

Country	number
CZ	14248
HU	20857
PL	15002
RS	5334
SK	9182
Total	64623

Source: own study

The next stage of database preparation concerned eliminating companies that revealed an effective tax rate of over 100%. Such a situation may result from incorrectly determining deferred income tax or a one-off settlement of assets or provisions for deferred income tax. The final research sample covers 61,219 companies, as shown in Table 3.

Table 3. Final research sample

Country	number
CZ	12720
PL	14608
RS	5084
SK	8382
HU	20425
Total	61219

Source: own study

Table 4 presents the research sample divided by economic activity sectors, according to the BvD Sector classification.

Table 4. Research sample – sector classification

Sector	CZ	PL	RS	SK	HU	Total
Agriculture, Horticulture & Livestock	777	114	157	290	805	2143
Biotechnology and Life Sciences	49	78	29	16	95	267
Business Services	1407	1317	472	1398	2463	7057
Chemicals, Petroleum, Rubber & Plastic	415	642	178	177	419	1831
Communications	85	74	26	34	109	328
Computer Hardware	9	7	34	4	8	62
Computer Software	354	361	89	159	417	1380
Construction	1201	1264	410	697	2292	5864
Food & Tobacco Manufacturing	278	530	326	147	602	1883
Industrial, Electric & Electronic Machinery	811	672	188	338	761	2770
Information Services	2	4	2	2	3	13
Leather, Stone, Clay & Glass products	155	220	35	55	159	624
Media & Broadcasting	thirty	81	18	11	80	220



Metals & Metal Products	787	767	206	449	821	3030
Mining & Extraction	43	82	18	22	45	210
Miscellaneous Manufacturing	56	40	18	15	43	172
Printing & Publishing	79	140	80	50	159	508
Property Services	738	862	39	406	943	2988
Public Administration, Education, Health Social Services	187	465	15	136	245	1048
Retail	461	896	336	883	2736	5312
Textiles & Clothing Manufacturing	101	179	153	89	216	738
Transport Manufacturing	169	152	31	65	96	513
Transport, Freight & Storage	610	713	328	497	1157	3305
Travel, Personal & Leisure	309	313	142	286	1091	2141
Utilities	416	487	57	125	88	1173
Waste Management & Treatment	158	200	57	63	130	608
Wholesale	2799	3515	1474	1809	4111	13708
Wood, Furniture & Paper Manufacturing	234	433	166	159	331	1323
Total	12720	14608	5084	8382	20425	61219

Source: own study

In order to verify the research hypotheses, the following variables will be used in the study:

- ETR - effective tax rate is based on data from financial statements - profit and loss account. This method of calculating the ETR variable is used when making decisions by companies (Graham et al. (2013), Kraft (2014)), so it will act as an independent variable in the study.

$$ETR = \frac{\text{income tax (actual + deferred)}}{\text{gross profit or loss}}$$

- LNA - Company size can be measured in many ways. A standard measure of company size applicable to companies listed on regulated capital markets and private companies is a measure based on the size of the balance sheet total (Lazar 2014, Jiménez-Angueira (2018).

$$LNA = \ln(\text{total assets})$$

- Accounting practice - a binary variable with a value of 1 for companies using IFRS and a value of 0 for companies applying local GAAP.

The research hypotheses' verification will be carried out using linear regression models for individual countries.

3. THE RESEARCH RESULTS

The analysis of the relationship between the companies' size and the ETR will be conducted for each country separately. This is because the analyzed countries had different income tax rates. This is presented in Fig. 1 for 2018 and Fig. 2 for 2017.

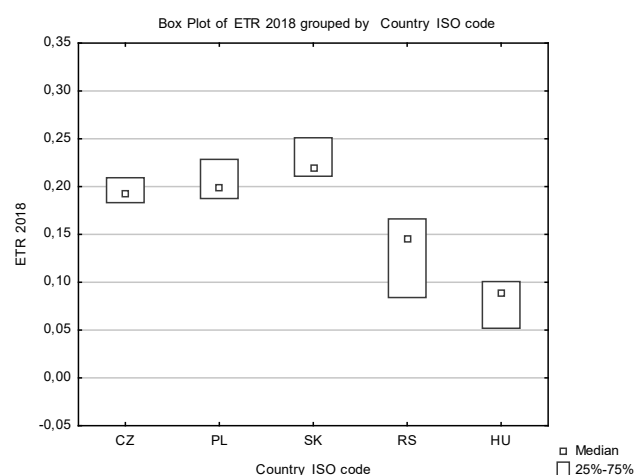


Figure 1. -Effective tax rate in 2018

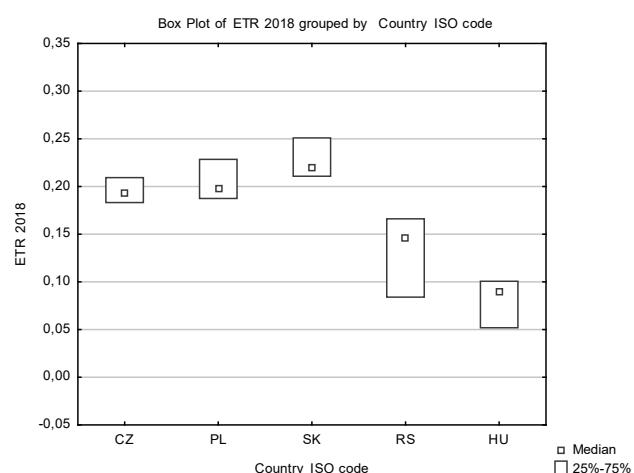


Figure 2. -Effective tax rate in 2017

Based on Figure 1 and Figure 2, it can be seen that in 2018 and 2017, the medians of ETR coincided with the statutory corporate income tax rates. It can, therefore, be concluded that the ETR reflects well the tax burden on companies.



In line with the research hypotheses, it is expected that the coefficients for the LNA and Accounting practice variables will be

positive in the analyzed period of 2018 and 2017. The regression analysis results are presented in Table 5 and Table 6.

Table 5. Regression results for 2018

Aggregate Results Parameter Estimates (date 24.08.2020) Sigma-restricted parameterization					
Effect	Country ISO code	ETR 2018 (Param.)	ETR 2018 (Std.Err)	ETR 2018 (t)	ETR 2018 (p)
Intercept	CZ	0.1824	0.0109	16.7724	0.0000
LNA 2018	CZ	0.0010	0.0006	1.5518	0.1207
Accounting practice 2018	CZ	0.0089	0.0088	1.0047	0.3151
Intercept	PL	0.2467	0.0067	36.6818	0.0000
LNA 2018	PL	-0.0023	0.0006	-3.5546	0.0004
Accounting practice 2018	PL	-0.0047	0.0031	-1.5451	0.1223
Intercept	SK	0.2853	0.0152	18.7665	0.0000
LNA 2018	SK	-0.0034	0.0011	-3.1557	0.0016
Accounting practice 2018	SK	-0.0119	0.0109	-1.0943	0.2738
Intercept	RS	0.1711	0.0119	14.3252	0.0000
LNA 2018	RS	0.0007	0.0012	0.6163	0.5377
Accounting practice 2018	RS	-0.0350	0.0071	-4.8947	0.0000
Intercept	HU	0.3465	0.0244	14.2061	0.0000
LNA 2018	HU	-0.0210	0.0007	-30.8995	0.0000
Accounting practice 2018	HU	-0.0781	0.0236	-3.3146	0.0009

Dependent Variable	Country ISO code	Multiple (R)	Multiple (R2)	Adjusted (R2)	SS (Model)	df (Model)	MS (Model)	F.	p
ETR 2018	CZ	0.01547	0.00024	0.00008	0.03263	2.00000	0.01631	1.52223	0.21827
ETR 2018	PL	0.02991	0.00089	0.00076	0.17565	2.00000	0.08782	6.54079	0.00145
ETR 2018	SK	0.03459	0.00120	0.00096	0.16239	2.00000	0.08119	5.01951	0.00663
ETR 2018	RS	0.07017	0.00492	0.00453	0.32186	2.00000	0.16093	12.57042	0.00000
ETR 2018	HU	0.21155	0.04475	0.04466	16.94004	2.00000	8.47002	478.36311	0.00000

Source: own study

Based on Table 5, it can be concluded that in 2018 in 3 countries: Poland, Slovakia, and Hungary, there was a negative correlation between the size of the companies and ETR. This means that larger companies reported lower tax burdens. Additionally, in 2 countries: Serbia

and Hungary, the ETR was influenced by the companies' accounting principles - IFRS.



Table 6. Regression results for 2017

	Country ISO code	ETR 2017 (Param.)	ETR 2017 (Std.Err)	ETR 2017 (t)	ETR 2017 (p)
Intercept	CZ	0.190864	0.010471	18.22702	0.000000
LNA 2017	CZ	0.000961	0.000608	1.57967	0.114208
Accounting practice 2017	CZ	-0.004098	0.008571	-0.47808	0.632599
Intercept	PL	0.242136	0.006463	37.46444	0.000000
LNA 2017	PL	-0.002529	0.000614	-4.12210	0.000038
Accounting practice 2017	PL	0.000809	0.002961	0.27329	0.784631
Intercept	SK	0.296460	0.014764	20.08033	0.000000
LNA 2017	SK	-0.005188	0.001012	-5.12886	0.000000
Accounting practice 2017	SK	-0.011237	0.010764	-1.04392	0.296551
Intercept	RS	0.190895	0.010717	17.81292	0.000000
LNA 2017	RS	-0.000517	0.001057	-0.48934	0.624619
Accounting practice 2017	RS	-0.054669	0.006540	-8.35870	0.000000
Intercept	HU	0.297205	0.022612	13.1438	0.000000
LNA 2017	HU	-0.015821	0.000614	-25.7608	0.000000
Accounting practice 2017	HU	-0.073395	0.021903	-3.3509	0.000807

Dependent Variable	Country ISO code	Multiple (R)	Multiple (R ²)	Adjusted (R ²)	SS (Model)	df (Model)	MS (Model)	F.	p
ETR 2017	CZ	0.015313	0.000234	0.000077	0.030018	2	0.015009	1.490138	0.225381
ETR 2017	PL	0.035898	0.001289	0.001152	0.236590	2	0.118295	9.422673	0.000081
ETR 2017	SK	0.056021	0.003138	0.002900	0.409765	2	0.204883	13.18976	0.000002
ETR 2017	RS	0.116561	0.013586	0.013198	0.737739	2	0.368869	34.99161	0.000000
ETR 2017	HU	0.177808	0.031616	0.031521	10.19302	2	5.096509	333.3691	0.00

Source: own study

The regression analysis in Table 6 shows similar relationships between the variables in 2018 and 2017. In 2017, for three countries: Poland, Slovakia, and Hungary, there was a negative relationship between the size of companies and ETR. In two countries: Serbia and Hungary, the ETR was dependent on the adopted accounting principles. Companies using IFRS had lower ETRs.

4. CONCLUSION

The aim of the paper was to check the relationship between the companies' size and the effective tax rate in the Visegrad countries and Serbia. Based on the literature review, it was hypothesized that there is a positive correlation between ETR and the companies' size.

The positive relation indicates that larger companies fulfill their socially responsible role through higher tax burdens. In each country in 2017 and 2018 no relationships confirming the research hypotheses were noticed. In many countries it is noted that the tax base is greater than the gross financial result. The adjustment to the tax expense in the income statement relates to the mandatory recognition of deferred income tax under IFRS. It can, therefore, be concluded that companies applying IFRS should disclose a lower tax burden. This has been confirmed in 2 countries: Serbia and Hungary.

The limitation of the study is the analysis of selected variables influencing ETR. The phenomenon of tax avoidance is very complex, and in further research, it will be developed with further factors influencing the formation of the effective tax rate.



5. ACKNOWLEDGMENT

This paper is part of the project No. 22010083 entitled “Experience sharing of Visegrad countries to tax avoid activity” financed by the International Visegrad Fund.

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DOES TAX EVASION SIGNIFICANTLY CONTRIBUTE TO OVERALL ECONOMIC CRIME IN SERBIA?

Goranka Knežević^{1*},
Vladan Pavlović²,
Kıvanç Halil Arıç³

¹Singidunum University,
Belgrade, Serbia

²University of Pristina -
K. Mitrovica,
Faculty of Economics,
K. Mitrovica, Serbia

³Sivas Cumhuriyet University,
Faculty of Economics and
Administrative Sciences,
Department of International
Trade and Logistics,
Turkey

Abstract:

Tax evasion is one of the main types of economic crime conducted by entities and individuals. We have shown that number of individuals prosecuted for tax evasion contributed in 2014 with 28.67% of total prosecuted economic crime acts, and then it rose to 57.45% in the year 2018. That implies that the tax modernization project which covers the period from 2018 to 2023 is a project of great importance.

Keywords:

tax evasion, economic crime.

1. INTRODUCTION

At the global level economic fraud cost the economy 3.6 billion US \$ (ACFE,2020). Among economic crime, tax evasion is one of the main types of crime conducted by entities and individuals. In this article, we will focus on entities' tax evasion. Tax evasion is one of the main problems in transition economies influencing not only governmental revenue and budget but also governmental spending and it raises inequality between honest taxpayers and tax evaders. In terms of not being caught tax evaders are exposed to low risk and high return in comparison with the honest taxpayers. Many researchers show interest in tax evasion trying to determine factors that influence it (Abdixhiku, 2013). There are micro and macro factors influencing tax evasion. Among macro factors, there are tax rates, tax structure, tax system, country general macroeconomic factors such as inflation, corruption level, political system, the legal system, and the possibility of individuals and firms to be detected. Among micro factors tax, morale, firm characteristics, profitability, leverage, capital intensity ratio, and other factors influence firms to evade taxes. In Serbia, as a transition economy, many factors influence tax evasion. Savić, Dragojlović, Vujošević, Arsić and Martić (2015) show that in 18 European countries including Serbia the efficiency of tax administration affects tax evasion. The main goal of this research is to investigate the influence of the number of employees in tax administration and employment rate on the grey economy level. The assumption is that an increase in the total number of employees in the tax administration will have a negative impact on the level of the grey economy. Randelović (2014) provides evidence on the impact of the change in income tax rates and the degree of its progressiveness on the scale of labor tax evasion in Serbia. Evading payroll taxes in Serbia are quite a common scheme of tax evasion. Our research was built on the theoretical assumption that the higher is the ability of being caught more efficient is the tax system.

Correspondence:
Goranka Knežević

e-mail:
gknezevic@signidunum.ac.rs



If there are more individuals prosecuted the better are legal rules and law enforcement system implying a higher probability of being caught for tax evasion.

To develop this idea, our paper is structured as follows. Firstly, economic crime and tax evasion are defined contextually. After that, we developed an extensive literature review regarding tax evasion and its influencing factors, followed by the descriptive statistics and discussion of the results.

2. ECONOMIC CRIME AND TAX EVASION

There are many different aspects to defining tax evasion. Tax evasion is a criminal act that is part of economic crime. Economic crime is an illegal act committed within a business to gain economic advantages (Appelgren, & Sjogren, 2001: according to Sjogren, & Skogh, 2004 p.128). In the same book, there is a distinction made between white-collar crime as a term used by Sutherland in 1949 which describes criminals in respect of their profession and characteristics, while the term occupational fraud used by ACFE in its Report to the Nations is a much wider term covering corruption, asset misappropriation, and financial statement fraud. Occupational fraud is the use of one's occupation for personal enrichment through the deliberate misuse or misapplication of the employing organizations' resources of assets (ACFE, 2020).

Economic crime consists of many different violations of the Criminal Law such as fraud in performing an economic activity, insurance fraud, embezzlement in economic activity, abuse of trust in performing an economic activity, tax evasion, failure to pay withholding taxes, abuse of the position of a responsible person, misfeasance in public procurement, abuse in the process of privatization, restricting deals, taking bribes, giving bribe, bankruptcy fraud, false bankruptcy, damaging creditors, smuggling, unauthorized trade, unauthorized manufacturing, unauthorized use of another business name, damaging business image and credit standing, counterfeiting money, revelling business secrets, forging securities, forgery, and misuse of credit cards, forgery of trademarks, making and giving others means of falsification a money laundering. So, tax evasion is only one tax scheme conducted by fraudsters.

The legal definition of tax fraud has been given in the Criminal Act of the Republic of Serbia under article 225 (Official Gazette of Republic of Serbia, No. 85/20005, corr.107/2005, corr.72/2009, 111/20009, 121/2012, 104/2013, 108/2014, 94/2016, 35/2019). Tax fraud is defined as a willful act in which fraudster has an intent to fully or partially avoid tax obligations using different schemes such as a) giving false revenue reports and facts which are correlated with the tax calculation, b) not providing

facts regarding lawful income or c) concealing information or other data which are relevant for determining and calculating tax liability of that person or entity. Law on tax procedure and tax administration (Official Gazette of the Republic of Serbia 2006, 63/2006 - 61/2007, 20/2009, 72/2009 - 53/2010, 101/2011, 2/2012 - 93/2012, 47/2013, 108/2013, 68/2014, 105/2014, 91/2015, 112/2015, 15/2016, 108/2016, 30/2018, 95/2018 and 86/2019) in heading 5, article 135 define tax evasion as a criminal offence whose consequence is tax evasion, submission of false documents, jeopardizing tax collection and tax audit, illegal sale of excise goods and other illegal activities in connection with tax evasion.

Tax evasion is defined as a managerial decision not to fully report a taxable corporate profit to reduce tax payment (Sandmo, 2005). According to this author, tax evasion is a violation of the law, while tax avoidance is an action done within the legal framework. Alm, Martinez-Vazquez and McClellan (2016) define tax evasion as „illegal and intentional action taken by the individuals to reduce their legally due taxes...by underreporting income, overstating deductions, exemptions or credits, by failing to file appropriate tax returns or even engaging in barter... while in the corporate income tax returns firm can underreport income, overstate deductions or fail to file tax returns.“

In the above-mentioned definitions, it is obvious that legal perspective and academic perspective on defining tax evasion have one common aspect –at the corporate level tax evasion is done by using different transactions. In the context of corporations, tax evasion is done by using accounting techniques of recognition and measurement of accounting items such as revenues and expenses correlated with the preparation of false accounting documents (invoices and reports) to avoid legal tax obligations. If we take into consideration indirect taxes such as VAT (value-added taxes) those accounting transactions and its connection to the tax evasion is even more obvious (fail to register for VAT, underreport sales, present false invoices that allow a corporation to underestimate their tax liability). Therefore, all of these transactions to evade taxes are finally materialized in operating profit before taxes and influence the income tax base itself.

“Plan of income tax controls” issued by the Serbian Internal revenue Service in the year 2019 stated micro factors that are correlated with the huge risk of tax avoidance and tax evasion. This factor is the size of company measured by operating revenues and operating expenses and the % of operating profit in the total revenue. Efficiency of tax audit depends on risk factors and companies with higher operating profit are more included in the tax audit.



3. LITERATURE REVIEW

There is a wide variety of academic literature regarding tax evasion. Many articles explain the interrelationship between corruption and firm tax evasion. Alm et. al (2016) demonstrate that the corruption of tax officials is a statistically and economically significant determinant of tax evasion. In the article of Alon and Hageman (2013) explanations were made regarding the correlation between firm tax compliance and corruption in 5000 firms from 22 transition economies from the former Soviet Union. Abdixhiku, Krasniqi, Pugh and Hashi (2017) found that the tax evasive behavior of firms is positively influenced by low trust in government and judicial system. Authors also find that individual businesses such as sole proprietorship and micro entities are less visible to tax authorities and are much more involved in tax evasion. Pashev (2008) makes a correlation between tax compliance of small and medium-sized entities and corruption in Bulgaria.

McGee (2008) elaborates on the opinions of tax evasion in Asia and found that in Asia women are more opposed to tax evasion than men and older people also opposed more to tax evasion than younger people. Brink and Porcano (2016) show that multiple cultural and structural variables have a direct impact on tax evasion. Androniceanu, Gherghina and Ciobănașu (2019) found that the reduction of tax evasion generates a considerable increase of the macroeconomic indicators. Đurović-Todorović, Ristić and Đorđević (2018) show that the number of tax inspectors and the number of controls with irregularities have a positive, statistically significant impact on the volume of tax evasion in Serbia.

Irianto, Sudibyo and Wafirli (2017) try to assess the influence of size, leverage, capital intensity, and profitability on tax avoidance. Size has a positive influence on the effective tax rate, while profitability, capital intensity, and leverage have no significant influence. Aminah, Chairina and Sari (2018) found that profitability and political connections have influence on tax avoidance.

Allingham and Sandmo (1972) show that probability of detection influences tax avoidance, and it is dependent on the amount of income reported. Tax authorities believe that rich individuals are most likely to evade their taxes.

Erickson, Halon and Maydew (2004) stated that publicly listed firms main incentive is to report higher earnings at the expense of paying higher taxes.

Slemrod (2007) finds that business plays a central role in the tax system of any country. There is a huge non-compliance of US businesses in the area of corporate income taxes, so-called tax gap was estimated to be 30 billion US \$ in 2001. But the estimated non-compliance rate of larger companies is lower, while for medium-sized companies tax gap is wider.

In the US tax gap is evaluated using US General Accounting office data – for small companies using IRS Taxpayer Compliance Measurement Program data, while for medium-sized companies the gap is calculated using operation audits and for large companies that are routinely investigated by the IRS calculations of tax gap or misrepresentation of tax reporting and non-compliance is directly calculated.

According to the literature review given in the previous section, the following research question is developed:

Does the tax evasion contribute more to the economic crime in Serbia than other types of fraud?

The stricter legal system and better tax administration is more capable of dealing with tax evaders therefore more people will be prosecuted for tax evasion. Since 2015 Serbian Government adopted STA transformation program for the period 2015-2020 which is supported and coordinated by the World Bank Tax administration modernization project with the main goal of improving collectiveness of taxpayers and lowering the compliance burden for taxpayers. In the year 2016 Tax administration diagnostic report was issued showing that Serbian tax administration is less automated and there is a limited accuracy of data gathered per each registrant in the tax system. That is why tax modernization is one of the key goals of the Serbian Government. We do expect that by modernization of tax system in Serbia there will be less individuals prosecuted for the tax evasion in years to come.

First tax modernization project covers a period of six years from 2018 to 2023. The first component of this project brings changes in the legal environment in terms of decreasing number of loopholes in the tax legal system. The second is human resource change and capacity building and tax operations. The third is a management modernization and digitalization or ICT system building. The fourth component is a project management and change management. Reengineering of the existing business processes will be done during this project and activities included are: tax registration, tax accounting and audit control. In the year to come, we strongly believe that the tax system will be efficient and tax audits will help to find tax evasion areas, to decrease loopholes in those areas and to prosecute less individuals for this type of crime. Tax modernization reform should affect fraudsters in Serbia not to commit this type of crime and its contribution to the economic crime percentage in the future should be lower.



4. METHODOLOGY OF THE RESEARCH

Five years of observations of the tax evasion and economic crime data are included in this paper. Data are obtained from by the Statistical Office of the Republic of Serbia.

Internal validity is the extent to which we achieve matching the structure of research design with the unambiguous conclusions. In this study, we use secondary sources of data that we think match the needs of our research. There is a low risk of bias or error in the research results because the secondary data source can be determined to be reliable (Statistical office of the Republic of Serbia).

The external validity of the research in terms of generalizing the results beyond the sample is limited. We took the sample of individuals prosecuted for tax evasion and economic crime in from Serbia and we draw conclusions that are country, cultural, and socio specific.

5. RESULTS AND DISCUSSION

In Table 1 results regarding the comparison between prosecuted economic crime and prosecuted tax evasion are given.

Table 1. Comparison between prosecuted economic crime and prosecuted tax evasion in Serbia in the period 2014-2018

Year	Prosecuted individuals for economic crime	Prosecuted individuals for tax evasion	% of tax evasion criminal acts in total economic crime
2014	2748	788	28,67
2015	2570	778	30,27
2016	2375	643	27,07
2017	2015	649	32,2
2018	1683	967	57,45
Total	11391	3825	/

Source: Statistical office of the Republic of Serbia

Taking into consideration only economic crime it is obvious from Table 1 that number of individuals prosecuted for this type of crime decrease from 2014 -2018. The number of individuals prosecuted for tax evasion decreases from 2014-2017 but shows a significant growth in the year 2018.

According to Table 1 % of individuals prosecuted for tax evasion increase from 28,67% in the year 2014 up to 57,45 % in the year 2018. Based on the results we can conclude that tax evasion is considered to be one of the most important criminal acts within the economic crime in Serbia in the 5 year period taken in observation.

Table 2. Prosecuted individuals for the economic crime in the period 2014-2018

Year	Prosecuted individuals for economic crime	Index (Base year 2014=100)
2014	2748	100
2015	2570	93,52
2016	2375	86,42
2017	2015	73,32
2018	1683	61,24
Total	11391	-

Source: Statistical office of the Republic of Serbia and authors' own calculation

Table 2 shows that number of individuals prosecuted for economic crime constantly decreases compared with the base year (2014). In the year 2015 index of individuals prosecuted for this type of crime is 93,5 or it is a decrease of 6,48% compared with the base year. In the year 2016 index is 86,42 or it is for 13,58% lower number of indi-

viduals prosecuted than those in the base year. In the year 2017, this index is even lower and it is 73,32 meaning that the number of individuals prosecuted for an economic crime is 26,68% lower than in the base year. The same conclusion can be drawn for 2018 where the number of individuals prosecuted is 38,76% lower than in the year 2014.



Therefore, modernizing the legal system and preventive measures in the period 2014-2018 were effective in terms of reducing the number of people willing to commit this

type of crime. If individuals are more aware of being caught they will less use their abilities to commit this type of crime.

Table 3. Prosecuted individuals for the tax evasion in the period 2014-2018

Year	Prosecuted individuals for tax evasion	Index (Base year 2014=100)
2014	788	100
2015	778	98,73
2016	643	81,59
2017	649	82,36
2018	967	122,71
Total	3825	-

Source: Statistical office of the Republic of Serbia and authors' own calculation

Table 3 shows the number of individuals prosecuted for the tax evasion and respective index numbers. It is shown that number of individuals prosecuted decrease in the year 2015 for only 1,27% which is much lower than individuals prosecuted for the economic crime in the same period, showing that tax evasion is much more rigid crime component than other types of economic crime. In the year 2015 decrease is 18,41% compared with the base year (2014), while in the year 2016 decrease is 17,64%. The last year taken into considerations shows an extreme and abrupt change in the number of individuals.

The index is 122,71 meaning that more individuals are caught for tax evasion in this year than in the base year. The number increased for 22,71%, implying that preventive measures and efficient tax system started to show its effects in this year. This could be a result of all measures applied in the whole 5 year period in questions whose effects accumulated in the year 2018, so that is why large increase is shown. Serbia started to change its tax administration by educating more tax officials since the year 2014. This could also contributed to the results for the year 2018.

Table 4. Descriptive statistics of Economic crime and Tax evasion in Serbia in the period 2014-2018

	N	Minimum	Maximum	Mean	Std. Deviation
Economic crime	5	1683	2748	2278.20	429.758
Tax evasion	5	643	967	765.00	132.138
Valid N (listwise)	5				

Source: Authors' own calculations

Table 4 shows that in a five year period a minimum number of individuals prosecuted for an economic crime is 1683 and a maximum of 2748, while the mean number is 2278. The standard deviation is 430 individuals, showing a large deviation from the sample mean.

For tax evasions situation is different. Mean number of individuals prosecuted is 765 while standard deviation is 132. Fluctuating number of individuals prosecuted for both types of crime support the idea of efficient tax administration in Serbia in the above mentioned period of time.

Both standard deviations are high implying that 5-year period taken into consideration in this descriptive analysis shows large variations in observing variables.

6. CONCLUSION

The research question has been confirmed by the data showing that tax evasion significantly contributes to the economic crime in Serbia in the last 5 years (the period from 2014 to 2018). According to the data, prosecuted individuals for tax evasion contributed in 2014 with 28.67% of total prosecuted economic crime acts, and then it rose to 57.45% in the year 2018. Therefore, by showing a double increase in the mentioned period, conclusion regarding more efficient legal system and tax administrative system can be drawn. Other researchers show that tax rate, audit probability and fine influence tax evasion (Kiri, 2016).



Allingham and Sandmo (1972) show that the increase in the probability of detection increase the reported income of companies. Tax administration modernization reforms started in 2015 in Serbia. Data in the year 2018 supported the idea that reform is efficient because 50% more individuals are prosecuted for tax evasion than in the year 2014. So, statistics confirms that reform has its effects in building the capacity of tax administration and decreasing loopholes in the legal system.

7. ACKNOWLEDGMENT

This paper is part of the project No. 22010083 entitled "Experience sharing of Visegrad countries to tax avoid activity" financed by the International Visegrad Fund.

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TAX EVASION, PREVENTION MEASURES AND DETECTION PROCEDURES - THE CASE OF THE REPUBLIC OF SERBIA

Anja Galečić^{1*},
Lidija Barjaktarović²

¹Student,
Singidunum University,
Belgrade, Serbia

²Singidunum University,
Belgrade, Serbia

Abstract:

The subject of research is to determine the knowledge and understanding of the importance of tax evasion (TE) and prevented measures in the Republic of Serbia. The main findings of executed research in 2019 were: 1) the majority of respondents were aware of TE, 2) working illegally is the most common way of TE, 3) the majority of respondents said that they hadn't received the bill after every shopping, 4) all respondents stressed that some party should be penalized for not possessing the bill after shopping, 5) the majority of respondents answered that adequate tax propaganda was the way of educating tax payers, 6) the majority of respondents would not report any notice of any form of TE. The state and tax authorities should take measures in order to create win-win climate for all stakeholders in order to reduce TE.

Keywords:

tax evasion, penalties, prevention, reduction, education.

1. INTRODUCTION

Tax evasion (TE) is the non-payment of a statutory amount of tax (Jovašević & Simović, 2017). TE is the most common form of gray economy (Criminal Law, 2016). The prescribed penalties are strict, but in the practice they are too light. About 99% of perpetrators are punished on probation or in cash (Šuput, 2015; Vranko, 2015; Ivanović, 2014; Popović, 2012).

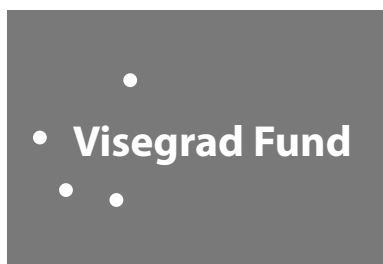
TE most often occurs in private activities, but also in the connection of private companies with the public sector. It is usually done through: 1) a reduction in the tax base, by increasing costs or reducing revenues, 2) payments of salary "on hand", 3) "phantom firms" which don't have assets, employees, actual turnover of goods and services, and they are registered on a person who doesn't exist or has sold his/her own data (Stojanović & Delić, 2018; Hoopwood et.al, 2014). Furthermore, globalization and transition on the world market, as well as on ours, lead to the creation of new forms of TE, which represents a great social danger (Kaličić, 2015).

Tax collection is one of the most significant revenues for the state. Due to great losses that have occurred over the centuries, the basic goal of the company and the state should be the prevention of fraud (Vukša et.al, 2013).

The subject of the paper is to determine the level of awareness of students and employees on the importance of TE in the Republic of Serbia /RS/ (Galečić, 2019). The aim of this paper is to assess it and to define the measures that can prevent it. The assumptions of the research are that: 1) business respondents are more knowledgeable about TE, 2) students are less knowledgeable because they did not encounter opportunities for TE as employees, and 3) both groups of respondents need to be more aware

Correspondence:
Anja Galečić

e-mail:
anja.galecic.18@singimail.rs





of the usefulness of tax collection. Accordingly, the work is conceived in 4 parts. The introduction is the first part. The methodology is presented in the second part of the paper. The results of the research are in the third part of the paper. The conclusion is the last part of the paper.

2. METHODOLOGY

In order to determine the knowledge and understanding of the importance of TE and prevented measures, authors of the research prepared the questionnaire, which was subject of discussion with relevant competent persons in RS. After the final approval, the questionnaire was sent on 100 e-mail addresses – to two equal groups of participants (50 each): students (on the higher years of the faculty or master studies) and employees (with huge experience in their field of expertise). Response rates of both groups were 60% i.e. 30 students (60% economists and 40% lawyers) and 30 employees (30% engineers, 30% technicians and 40% economists). The survey was executed in the first half of 2019.

The questionnaire consists of two parts: 1) general info about respondents – 3 questions (age, occupation and working experience) and 2) questions about importance and understanding of TE, way of execution and possibilities to prevent it – 17 questions (2 open and 15 multiple choices). The first question of the second part of the questionnaire was related to the awareness of TE. The second question was linked to the area where TE is present. The third question was related to the obvious TE. The fourth question was possibility for respondents to specify any type of TE. The fifth question was connected to the more common way of TE.

The sixth question was related to the more often way of executing TE in companies. The seventh question was linked to knowing somebody who works illegally. The eighth question was related to the receiving salary/earnings “on hands” at any time. The ninth question was connected to issuance of the bill after every shopping in a store. The tenth question was related to the party who should be penalized for not possessing the bill after shopping. The eleventh question was linked to the awareness of “phantom company”. The twelfth question was related to the awareness of types of penalties for the crime of TE. Furthermore, in the next question, respondents should answer whether penalties for TE should be stricter. Moreover, in the following question, respondents should answer which techniques should obtain better results in the prevention of TE. The fifteenth question was related to the way of education of tax payers. The sixteenth question was connected to personal attitude for reporting TE in the case of notice. The last question was open proposal of respondents for reducing TE.

3. RESEARCH RESULTS

The majority of respondents answered positively to the first question related to the awareness of TE (98.33%). All employees were aware of TE. Only the one student was not familiar with it (Table 1).

Table 1. Review on answers to the question: Have you heard of the term TE?

Offered answers	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Yes	30	100	29	96.67
No	0	0	1	3.33
Total	30	100	30	100

To the second question related to the area where TE is present (Table 2), the majority of respondents answered all over the world (95%).

All students considered it all over the world (100%). However, minority of employees answered that it was present in RS (6.67%) and Europe (3.33%).

Table 2. Review on answers to the question: Where TE is present (area)?

Offered answers	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
RS	2	6.67	0	0
Europe	1	3.33	0	0
All over the world	27	90.00	30	100
Total	30	100	30	100



To the third question related to the obvious of TE (Table 3), the majority of respondents answered everywhere (95%). All students chose the answer all over the world (100%).

However, the minority of employees answered that it was obvious in privately owned companies (10 %).

Table 3. Review on answers to the question: Where TE is obvious?

Offered answers	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
State owned companies	0	0	0	0
Private owned companies	3	10	0	0
Everywhere	27	90	30	100
Total	30	100	30	100

The fourth question was possibility for respondents to specify any type of TE (Table 4). The majority of respondents was able to specify any type of TE (71.66%). However, there is obvious difference in offered answers between students and employees due to (no) existence of working experience. Students had following ranking of answers: 1) no answer (46.67%); 2) working illegally /WI/ (23.33%); 3) avoidance of tax payment (16.67%); 4) not reported

tax on profit (10%); 5) money laundering (3.33%) and 6) not issuing fiscal bills (0%). Employees had following ranking of answers: 1) WI (40%); 2) not issuing fiscal bills (16.67%); 3) avoidance of tax payment (13.33%); 4) tree equal groups of respondents – not reported tax on profit, money laundering and no answer. It can be noticed that both groups put great importance on WI.

Table 4: Review of answers to the question: If you know, list some type of TE

Type of tax evasion	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Not reported tax on profit	3	10.00	3	10.00
Avoidance of tax payment	4	13.33	5	16.67
Money laundering	3	10.00	1	3.33
Not issuing fiscal bills	5	16.67	0	0.00
No answer	3	10.00	14	46.67
Total	30	100.00	30	100.00

To the fifth question related to the more common way of TE (Table 5), the majority of respondents (76.67%) answered WI, which is in line with the previous question. Equal group of respondents of students and employees (16.67% each) said that non-issuance of fiscal bills is the second common way of TE.

The third common way of TE was equal combination of WI and non-issuance of fiscal bills. However, there is a difference between the number of received answers between students (13.33%) and employees (3.33%).

Table 5: Review of answers to the question: To the best of your knowledge, which method of TE is more common?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
WI	24	80	21	70
Non-issuance of fiscal bills	5	16.67	5	16.67
Equally present	1	3.33	4	13.33
Total	30	100.00	30	100.00



To the sixth question related to more often way of executing TE (Table 6) two equal groups of respondents (50% each) said avoidance of VAT (Value-Added-Tax) payment and creative accounting. However, employees stressed that avoidance of VAT payment is more common

(56.67%), while students chose creative accounting (56.67%). It is interesting that in both groups of respondents was the same response rate regarding the more often way of executing TE. This can be explained with knowledge generated through working experience of employees.

Table 6. Review on answers to the question: To the best of your knowledge, TE in companies is more often done through?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Avoidance of VAT payment	17	56.67	13	43.33
Creative accounting	13	43.33	17	56.67
Total	30	100.00	30	100.00

To the seventh question related to knowing somebody who WI (Table 7), the majority of respondents (61.67%) said that they knew one or more than one person. The second large group of respondents (38.33%) answered that they didn't know any person that WI. It is interesting that

both groups of respondents had the same ranking scale regarding persons who WI. This can be explained with employment experience which had both groups and their acquaintances – type of engagement, internship, part-time, replacement or similar.

Table 7. Review on answers to the question: Do you know someone who WI?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
I know one person	3	10	0	0
I know more persons	15	50	19	63.33
I don't know	12	40	11	36.37
Total	30	100.00	30	100.00

To the eight question related to the receiving salary/earning “on hands” at any time (Table 8), the majority of respondents answered no (66.67%). It is interesting that both groups of respondents had the same percentage of positive and negative answers. It can be explained with the

fact that both categories of respondents or their acquaintances had relevant contracts which prescribed minimal salary or other type of earnings which was paid on the account.

Table 8. Review on answers to the question: Have you ever received a part of your salary/earning “on hand”?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Yes	10	33.33	10	33.33
No	20	66.67	20	66.67
Total	30	100.00	30	100.00

To the ninth question related to issuance of the bill after every shopping (Table 9), the majority of respondents said no (60%). However, there is big difference between the experience of employees and students regarding the receiving of the bill after shopping. It is obvious that they often received bills (53.33%) compared to students (26.67%).

It can be explained with the fact where both groups of respondents spent money (students usually spent money in cafes or small retail shops, while employees in big retail shops or restaurants).



Table 9. Review on answers to the question: Do you get a bill every time you shop in a store?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Yes	16	53.33	8	26.67
No	14	46.67	22	73.33
Total	30	100.00	30	100.00

The tenth question was related to the party who should be penalized for not possessing the bill after shopping (Table 10), the majority of respondents (78.33%) answered sellers. It is important to stress that for students, sellers are the only party which should be penalized for not issuing the bill after the sale. However, the minority of employees

said that both parties should be penalized (43.33%), i.e. buyers (23.33%) more than both parties (20%) at the same time. Here, we can notice that students are less knowledgeable about tax policy and the ways in which the state can and should act in order to increase public revenues.

Table 10. Review on answers to the question: to the best of your knowledge, who should be penalized for not having a bill?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Buyers	7	23.33	0	0
Sellers	17	56.67	30	100
Both	6	20	0	0
Total	30	100.00	30	100.00

To the eleventh question related to awareness of “phantom companies” (Table 11), the majority of respondents said yes (85%). However, there is a difference between the level of familiarity between employees (93.33%) and students

(76.67%). It can be noticed that employees are aware of those companies and their activities. Furthermore, it can be concluded that employees are better informed as a result of working experience or proper education.

Table 11. Review on answers to the question: Have you heard of the existence of the “phantom company”?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Yes	28	93.33	23	76.67
No	2	6.67	7	23.33
Total	30	100.00	30	100.00

To the twelfth question related to the awareness of types of penalties for the crime of TE (Table 12), all respondents (100%) answered positively. Furthermore, the majority of respondents (64.67%) said mixed penalties (cash and prison) are more common. The second large group of respondents (16.67%) answered cash, while the

majority of respondents (3.33%) said prison. It is interesting that both groups of respondents ranked on the same way type of penalties for TE. It can be explained with the fact that both groups of respondents are well informed, which can be a result of good tax propaganda.

Table 12. Review on answers to the question: What do you think are the penalties for the crime of TE?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Cash	5	16.67	5	16.67
Prison	2	6.66	0	0
Mixed	23	76.67	25	83.33
Total	30	100.00	30	100.00



To the thirteenth question related to the stricter penalties for TE (Table 13), two equal groups of respondents (50% each) answered positively and negatively. Furthermore, there is a difference between employees and students in the positive and negative answer. Students were for stricter penalties for TE (76.67%), while employees were for less strict penalties for TE (76.67%).

It is interesting that it is opposite response rate regarding stricter penalties between students and employees. It can be explained with the fact that employees are informed that there are other measures which can decrease the level of TE, such as decrease of tax rates on different subjects of taxation (such as salary, trade, etc.).

Table 13. Review on answers to the question: Should penalties for TE be stricter?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Yes	7	23.33	23	76.67
No	23	76.67	7	23.33
Total	30	100.00	30	100.00

To the fourteenth question related to obtaining better results in the prevention of TE (Table 14), the majority of respondents (53.33%) said reduction of tax rates. It goes in line with the previous question and employees' opinion. However, respondents who belong to students

had the equal response rate about both proposals (50%). It can be explained with the fact that students don't have working experience based on balanced approach of applied measures for the prevention of TE.

Table 14. Review on answers to the question: To the best of your knowledge, what would give better results in the prevention of TE?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Stricter penalties	13	43.33	15	50
Reduction of tax rates	17	56.67	15	50
Total	30	100.00	30	100.00

To the fifteenth question related to the way of education of tax payers in terms of adequate tax propaganda (Table 15), the majority of respondents (76.67%)

answered positively i.e. that tax propaganda helps in education of tax payers. It is important answer for further prevention of TE.

Table 15. Review on answers to the question: Do you think that tax propaganda can help educate taxpayers?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Yes	22	73.33	24	80
No	8	26.67	6	20
Total	30	100.00	30	100.00

To the sixteenth question related to reporting of any notice of any form of TE (Table 16), the majority of respondents (55%) said no. It is warning sign for the

state and tax authorities, who should proceed further in order to determine the reasons.

Table 16. Review on answers to the question: If you notice any form of TE, would you report?

Offered answer	Employees		Students	
	Absolute	Relative (%)	Absolute	Relative (%)
Yes	14	46.67	13	43.33
No	16	53.33	17	56.67
Total	30	100.00	30	100.00



To the last question related to proposal for reducing TE, employees said: decrease of tax rates (first of all on salaries and VAT), stricter penalty policy, tax education, and tax relieves, reconsideration of the origin of the property, and prevention of WI. The majority of students didn't have any proposal, and minority of them answered decrease of tax rates and more efficient tax policy. It can be concluded that both group of participants stressed that the decrease of tax rates would reduce TE.

4. CONCLUSION

Executed researches related to the knowledge and understanding of the importance of TE and prevented measures in RS (2019) had good response rates (60%).

Relevant conclusions are that employees are more knowledgeable about TE on the basis of answers related to: specification of any type of TE, determination of the common way of TE, avoidance of VAT payment is more often a way of execution of TE, receiving the fiscal bill after shopping, parties which should be penalized for not possessing the bill after shopping, measures which should be applied in order to reduce TE, and familiarity with the meaning and function of "phantom companies". Opposite, it can be concluded that students are less knowledgeable about tax TE on the basis of answers on previously mentioned questions. Finally, it can be concluded on the basis of answer that: 1) 55% of respondents would not report any notice of any form of TE, neither of them has a sufficiently developed awareness of the importance of collecting taxes. 2) 76.67% respondents answered that adequate tax propaganda was the way of education of tax payers. The state and tax authorities should take measures on further tax propaganda, education of tax payers and introduction of measures and climate that employees and students feel free to anonymously fulfill form of "your opinion is important to us" in order to get valuable input (suggestions) for some improvements in collecting public income i.e. reducing TE. It should lead to win-win situation for all stakeholders in the country.

Further researches will be focused on particular cases of TE in RS.

5. ACKNOWLEDGMENT

This research paper is part of the project No. 22010083 entitled "Experience sharing of Visegrad countries to tax avoid activity" financed by the International Visegrad Fund.

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EFFECTIVE TAX RATE IN V4 COUNTRIES AND SERBIA - SECTORAL APPROACH

Michał Biernacki*,
Piotr Luty

Wrocław University of
Economics and Business,
Wrocław, Poland

Abstract:

The study aims to investigate whether there were positive relationships between the size of the companies (LNA) and the effective tax rate in individual sectors of economic activity in the Visegrad countries and Serbia. The Political Cost Theory could explain the positive relationship. The analysis was carried out using regression analysis for individual sectors (BvD sector classification) and countries. The results indicate that there is a need for further research and extension to new reporting periods and variables.

Keywords:

Visegrad, tax avoidance, effective tax rate.

1. INTRODUCTION

Running a business is associated with the obligation to pay taxes. From the financial perspective of companies, paying the tax is associated with a reduction in cash that the company could spend on other purposes. For this reason, in developing countries, where awareness of corporate social responsibility is still weak, there may be a desire to avoid tax, understood as reducing the tax burden. Tax avoidance can be explained based on agency theory (Badertscher et al., 2013). According to this theory, companies have two groups of stakeholders who often have opposite goals. The first group consists of owners, often called principals in the agency's theory. The second group consists of people managing the company - the so-called agents. According to the agency's theory, owners may prefer tax avoidance activities, as they will be able to use the additional funds obtained in this way for their purposes (Kovermann, Velte, 2019).

On the other hand, investors (owners) may be reluctant to adopt tax avoidance practices that may be associated with higher tax risks or potential penal and fiscal sanctions. Based on the literature review, the following factors determining tax behaviour are listed: the amount of the tax rate, penalties and probability of detecting tax irregularities, risk aversion of tax decision-makers (Hanlon, 2010). Additionally, it can be noticed that in developed countries, there may also be a factor related to the reputation and perception of the company's tax behaviour by third parties. Austin and Wilson (2017) indicate the influence of consumers and their perception of the company on the phenomenon of tax avoidance. There is much research into the impact of ownership structure on tax avoidance.

Chen et al. (2019), Huseynov et al. (2017), Khan et al. (2016) noted that increasing the share of institutional owners leads to increased tax avoidance.

Correspondence:
Michał Biernacki

e-mail:
michal.biernacki@ue.wroc.pl



The opposite conclusions were revealed in the studies (Shleifer, Vishny, 1986; Khurana, Moser 2012). Discrepancies in research results indicate that tax avoidance is a complex process and that in different cultural, political and economic conditions, various factors may be decisive in reducing the tax burden.

Regardless of the ownership structure, the reduction of the tax burden may also result from the preferential treatment of selected segments of economic activity by public authorities. There may be detailed regulations in the tax system regarding the eligibility of costs, which affect the reduction or increase of the tax base. Tax benefits may apply to innovative companies in order to encourage new investors to set up a business in the territory of the selected country. Special treatment may also apply to companies which, by contributing to the labour market, support the inhabitants of a given country. Finally, tax advantages may apply to strategically important companies, which are often also controlled directly or indirectly by state authorities. Detailed regulations of tax law may, therefore, affect the development or inhibition of a given sector of economic activity. Therefore, a research question arises as to how the effective tax rate is shaped in individual sectors of economic activity, which is also a measure of tax avoidance.

An essential determinant of tax avoidance is the size of the companies. There are two theories related to the influence of the size of companies on the tax burden: Political Power Theory (PPT) and Political Cost Theory (PCT). According to the PPT, larger companies bear lower tax burdens (there is a negative relationship between the company's size and the effective tax rate). It may result from the greater possibility of influencing tax decisions (the theory is described in more detail in Belz et al. (2019)). According to PCT, there is a positive relationship between the size of the companies and the effective tax rate. This situation may occur when higher tax burdens are shifted to companies that are more profitable or larger in terms of assets (the theory is described in more detail in Belz et al. (2019)). It may result from the belief that a large company, thanks to its organizational and financial resources, will be able to bear the higher tax burden.

The article aims to analyze the impact of company size on the effective tax rate in the Visegrad countries (Poland, the Czech Republic, Slovakia, Hungary) and Serbia. To check if there are specific business sectors where PPTs or PCTs apply, and the analysis will be performed for 2018. It is a pilot study that will be extended to the next reporting years in the future. A research hypothesis can be made:

H1: There is a positive correlation between the size of companies and the effective tax rate in selected sectors.

2. RESEARCH SAMPLE AND METHODOLOGY

The research sample covers five countries: Poland, the Czech Republic, Slovakia, Hungary and Serbia. The choice of the Visegrad countries is because they are developing countries, with a similar political history, joining the European Union at the same time. The extension of the study to include companies from Serbia is based on the assumptions of the IVF grant number 22010083. The study was limited to 2018 due to the preliminary nature of the study.

The financial data comes from the BvD Orbis database, in which the following search criteria were assumed:

1. Status - active companies
2. World region / Country / Region in country - Czech Republic, Hungary , Poland, Serbia, Slovakia
3. Accounting practice - IFRS, Local GAAP
4. Total assets (m USD) - min = 0 in years 2018, 2017, 2016, 2015, 2014,
5. Taxation (m USD) - min = 0 in years 2018, 2017, 2016, 2015, 2014,
6. P/L before tax (m USD) - min = 0 in years 2018, 2017, 2016, 2015, 2014,
7. Size classification - Large, Medium, Very large

The final research sample required the introduction of additional selection steps:

1. eliminating companies that did not have an assigned classification of economic activities,
2. elimination of companies whose financial data was incomplete,
3. elimination of the banking sector,
4. limiting the effective tax rate to the range (0-1).

The introduced exclusions were used to limit the erroneous inference due to missing or incomplete data. Removal from further analysis of the banking sector resulted from the fact that this sector has specific legal regulations. Table 1 shows the final number of companies included in the study by country.

Table 1. Final research sample

Country	number
CZ	12720
PL	14608
RS	5084
SK	8382
HU	20425
Total	61219

Source: own study



Table 2 shows the companies broken down into sectors - BvD Sector.

Table 2. Research sample – sector classification

Sector	CZ	PL	RS	SK	HU	Total
Agriculture, Horticulture & Livestock	777	114	157	290	805	2143
Biotechnology and Life Sciences	49	78	29	16	95	267
Business Services	1407	1317	472	1398	2463	7057
Chemicals, Petroleum, Rubber & Plastic	415	642	178	177	419	1831
Communications	85	74	26	34	109	328
Computer Hardware	9	7	34	4	8	62
Computer Software	354	361	89	159	417	1380
Construction	1201	1264	410	697	2292	5864
Food & Tobacco Manufacturing	278	530	326	147	602	1883
Industrial, Electric & Electronic Machinery	811	672	188	338	761	2770
Information Services	2	4	2	2	3	13
Leather, Stone, Clay & Glass products	155	220	35	55	159	624
Media & Broadcasting	thirty	81	18	11	80	220
Metals & Metal Products	787	767	206	449	821	3030

Mining & Extraction	43	82	18	22	45	210
Miscellaneous Manufacturing	56	40	18	15	43	172
Printing & Publishing	79	140	80	50	159	508
Property Services	738	862	39	406	943	2988
Public Administration, Education, Health Social Services	187	465	15	136	245	1048
Retail	461	896	336	883	2736	5312
Textiles & Clothing Manufacturing	101	179	153	89	216	738
Transport Manufacturing	169	152	31	65	96	513
Transport, Freight & Storage	610	713	328	497	1157	3305
Travel, Personal & Leisure	309	313	142	286	1091	2141
Utilities	416	487	57	125	88	1173
Waste Management & Treatment	158	200	57	63	130	608
Wholesale	2799	3515	1474	1809	4111	13708
Wood, Furniture & Paper Manufacturing	234	433	166	159	331	1323
Total	12720	14608	5084	8382	20425	61219

Source: own study

In the analyzed countries, different corporate income tax rates had an impact on the effective tax rate (ETR) value. Table 3 shows the descriptive statistics for the effective tax rate (ETR) for Poland, the Czech Republic, Slovakia, Hungary and Serbia in 2018, 2017 and 2016.

Table 3. Effective tax rate in V4 countries and Serbia

Variable	Country ISO code	Valid N	Mean	Median	Minimum	Maximum	Std.Dev .
ETR 2018	CZ	12720	0.1993	0.1926	0.0000	1.0000	0.1035
ETR 2017	CZ	12720	0.1946	0.1923	0.0000	1.0000	0.1004
ETR 2016	CZ	12720	0.1936	0.1925	0.0000	1.0000	0.1056
ETR 2018	PL	14608	0.2234	0.1987	0.0000	1.0000	0.1159
ETR 2017	PL	14608	0.2219	0.1989	0.0001	1.0000	0.1121
ETR 2016	PL	14608	0.2216	0.1991	0.0001	1.0000	0.1086
ETR 2018	SK	8382	0.2476	0.2200	0.0000	1.0000	0.1272
ETR 2017	SK	8382	0.2456	0.2196	0.0000	1.0000	0.1248
ETR 2016	SK	8382	0.2548	0.2289	0.0000	1.0000	0.1324
ETR 2018	RS	5084	0.1425	0.1461	0.0000	0.9722	0.1134
ETR 2017	RS	5084	0.1337	0.1419	0.0000	0.9908	0.1034
ETR 2016	RS	5084	0.1264	0.1341	0.0000	1.0000	0.1028
ETR 2018	HU	20425	0.1151	0.0893	0.0000	1.0000	0.1361
ETR 2017	HU	20425	0.1098	0.0892	0.0000	0.9985	0.1256
ETR 2016	HU	20425	0.1179	0.0987	0.0000	0.9984	0.1276

Source: own study



Based on Table 3, it can be concluded that the lowest tax burden (median of the ETR variable) was in Hungary and the highest in Slovakia. Due to different national income tax rates, a further sectoral analysis will be country-by-country.

In order to answer the research question posed in the article and verify the research hypothesis, the following variables will be used:

- ETR - effective tax rate is based on data from financial statements - profit and loss account. This method of calculating the ETR variable is used when making decisions by companies (Graham et al., 2013, Kraft, 2014), an independent variable in the study.

$$ETR = \frac{\text{income tax (actual + deferred)}}{\text{gross profit or loss}}$$

- LNA - Company size can be measured in many ways. A standard measure of company size applicable to companies listed on regulated capital markets and private companies is a measure based on the size of the balance sheet total (Lazar, 2014, Jiménez- Angueira, 2018).

$$LNA = \ln(\text{total assets})$$

The verification of the hypothesis will be carried out with the use of linear regression analysis.

3. RESEARCH RESULTS

The article hypothesizes that there is a positive correlation between the size of companies and the effective tax rate in selected sectors of economic activity. The results of the regression analysis for individual sectors of economic activity and the countries selected in the study: Poland, the Czech Republic, Slovakia, Serbia and Hungary are presented in Table 4. Table 4 uses the following designations for the test results:

- “ Positive “ means the positive sign to the regression coefficient for the LNA variable
- “ Negative “ means the negative sign of the regression coefficient for the LNA variable
- “ no sign. “ means no statistically significant coefficient at the level of 5%.

Table 4. Regression results in BvD sectors

Variable	BvD Sector	PL	CZ	SK	RS	HU
LNA 2018	Agriculture, Horticulture & Livestock	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Biotechnology and Life Sciences	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Business Services	negative	no sign.	negative	no sign.	negative
LNA 2018	Chemicals, Petroleum, Rubber & Plastic	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Communications	no sign.	no sign.	no sign.	no sign.	no sign.
LNA 2018	Computer Hardware	no sign.	no sign.	no sign.	no sign.	no sign.
LNA 2018	Computer Software	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Construction	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Food & Tobacco Manufacturing	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Industrial, Electric & Electronic Machinery	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Information Services	no sign.	no sign.	no sign.	no sign.	no sign.
LNA 2018	Leather, Stone, Clay & Glass products	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Media & Broadcasting	no sign.	no sign.	negative	no sign.	no sign.
LNA 2018	Metals & Metal Products	negative	no sign.	no sign.	no sign.	negative
LNA 2018	Mining & Extraction	no sign.	no sign.	no sign.	no sign.	no sign.
LNA 2018	Miscellaneous Manufacturing	no sign.	no sign.	no sign.	no sign.	no sign.
LNA 2018	Printing & Publishing	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Property Services	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Public Administration, Education, Health Social Services	negative	no sign.	no sign.	no sign.	negative
LNA 2018	Retail	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Textiles & Clothing Manufacturing	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Transport Manufacturing	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Transport, Freight & Storage	negative	no sign.	no sign.	positive	negative
LNA 2018	Travel, Personal & Leisure	no sign.	no sign.	no sign.	no sign.	negative
LNA 2018	Utilities	no sign.	no sign.	no sign.	no sign.	positive
LNA 2018	Waste Management & Treatment	no sign.	negative	no sign.	no sign.	no sign.
LNA 2018	Wholesale	no sign.	positive	no sign.	no sign.	negative
LNA 2018	Wood, Furniture & Paper Manufacturing	no sign.	no sign.	no sign.	no sign.	negative

Source: own study



Table 4 shows that only in three sectors, there was a positive correlation between the size of the companies and the effective tax rate. A positive correlation appeared for the Wholesale sector in the Czech Republic; Transport, Freight & Storage in Serbia and Utilities in Hungary. It means that the PCT theory has a limited application for the Visegrad countries and Serbia. The negative correlation between the size of companies and the effective tax rate was much more frequent, according to the theory of PPT. Especially in Hungary, a situation in which large companies have lower tax burdens was noticeable. In 20 sectors in Hungary, there was a negative correlation between the size of the companies and ETR. For most sectors in Poland, the Czech Republic, Slovakia and Serbia, the regression analysis did not reveal any significant statistical coefficients for the LNA variable - company size. It means that the LNA variable did not alter the ETR. It may result from the complexity of the phenomenon of tax avoidance or the development of dependence other than linear.

4. CONCLUSION

The article aimed to analyze the impact of the size of companies (measured by the natural logarithm of total assets) on the effective tax rate in Poland, the Czech Republic, Slovakia, Hungary and Serbia. According to Political Cost Theory, there are specific sectors of economic activity in which there is a positive correlation. The results of the linear regression analysis show that only in 3 cases, a positive correlation was observed between the size of the companies and the effective tax rate. The hypothesis put forward in the study was only partially positively verified. The results of the study indicate that there may be other factors that, in combination with the size of companies, might be in line with the Political Cost Theory. The study of dependencies in developing countries: the Visegrad countries and Serbia, requires deepening. Based on Belz et al. (2019), there are publications in which the authors show no statistically significant relationship between the size of the companies and ETR.

The limitation of the study is the limitation of the study to 1 year - 2018. This limitation is due to the preliminary nature of the study. Additionally, future research will include the analysis of more variables.

5. ACKNOWLEDGMENT

This paper is part of the project No. 22010083 entitled "Experience sharing of Visegrad countries to tax avoid activity" financed by the International Visegrad Fund.

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USING BENFORD'S LAW TO DETECT TAX EVASION IN MICRO-ENTERPRISES IN SERBIA

Marko Milojević^{1*},
Ivica Terzić¹,
Snežana Stanišić²

¹Singidunum University,
Belgrade, Serbia

²Sinergija Univesity,
Bijeljina

Abstract:

The subject matter of this paper is to analyse the tax evasion by micro-enterprises in Serbia in respect of income tax. By applying Benford's law, we will empirically determine the degree of authenticity of the revenues disclosed by micro-enterprises in their financial statements and whether the tax base to which income tax is paid is disclosed realistically. The research was conducted on a sample of 45 micro-companies and analysis of their financial statements for the period from 2017 to 2019. The research results show that micro-enterprises in Serbia, for the most part, disclose their net income realistically and in accordance with Benford's law, meaning they don't show the tendency to underestimate their income with the aim to pay lower taxes or avoid paying them entirely. However the worrying results were obtained when the operating profit was tested. The findings of this research may yield great benefits both to auditors and tax authorities.

Keywords:

Benford's Law, tax evasion, fraud, net income, income tax.

1. INTRODUCTION

Public revenues are monetary liabilities which individuals and companies are obliged to pay, under threat of enforced collection, to the state, local self-government units and certain state-run mandatory social security funds to be used for the settlement of the needs of the society as a whole. Public revenues can also be defined as transactions which increase the government's net assets on all levels of government while simultaneously decreasing the purchasing power of the individuals and companies. The world recognizes four classifications of public revenues, and what they have in common is that majority of taxes can be classified into direct taxes (property tax, corporate income tax and individual income tax) and indirect taxes (VAT, excise tax, customs duties). Though indirect taxes are the most prolific type of tax in total public revenues, corporate income tax plays an especially important role in the consolidated balance of public revenues.

Accordingly, our research will be focused on the analysis of income tax evasion of the micro-enterprises in Serbia. Among creative accounting techniques used domestically, the accounting manipulations of income and profit are the most common. Small, and particularly micro-enterprises in our country, tend to deflate revenue to reduce the positive operating profit and thus decrease the amount of income tax payable and the amounts of advance income tax payments.

Income is an indicator of company's growth and entrepreneurial skills and it does not come as a surprise that owners of such companies opt for this creative accounting technique in order to pay as little tax as possible. It is believed that disclosure of lower-than-actual income most often implies the informal sale of products/services,

Correspondence:
Marko Milojević

e-mail:
mmilojevic@singidunum.ac.rs



which are not recorded in business books, including the exchange of fictitious invoices between several companies to increase expenses and thus deflate the operating profit.

In countries undergoing transition, such as Serbia, failure to disclose income and illegal sales are techniques deployed by offenders to manipulate financial statements in micro, small and medium-sized enterprises to avoid paying income tax. The consequence of such illegal actions, e.g. manipulation of income financial statements is reflected in the fact that liabilities, which are not disclosed, will not be paid, whereas in case of illegal sales, the tax balance sheets do not disclose the actual state of affairs.

Tax evasion is an action or omission on the part of a taxpayer aimed at evading tax when such taxpayer believes his true tax liability and tax burden are too high. These are the reasons why he opts for tax evasion, under the threat of the penalty. Tax evasion can take the form of legally permitted and illegal or unpermitted evasion. The analysis will deal with unpermitted evasion which takes place when the taxpayer violates the law or other regulations governing this matter in terms of tax evasion. It frequently results in the material undermining of the goals of the tax policy and practically annuls the objectives of taxation which is to establish a tax system characterised by a high degree of rationality, purposefulness, fairness, and efficiency.

The effectiveness of the tax system can be ensured only if there is an adequately trained, well-organised tax authority, which has available state-of-the-art equipment and properly educated and motivated, conscientious and honest tax officers who perform complex and highly sensitive duties of tax apportionment and collection, including the inspection of the tax collection process. However, the practice shows that it is often the case that companies attempt to disguise their true income and thus opt for partial or even fully fraudulent disclosure. When a company fails to report or inaccurately reports the elements essential for tax apportionment, the tax authorities may be misled about the actual taxpayer's financial capacity.

The goal of this paper is to propose the use of this technique to tax authorities but also to point out the importance which Benford's law and analyses can play in trying to discover anomalies in financial statements of small and medium-sized companies in Serbia which have direct consequences on income tax evasion or fraud. Bearing in mind the set goal, this paper will test the main hypothesis: Can Benford's law be used as a tool to investigate in detail the presence of any manipulations in the income statement (profit and loss) and net income disclosed or whether they are the result of employees' errors or other errors?

The remainder of this paper is divided into the following sections. The first section presents a short overview of corporate income tax regulations in Serbia and the concept of creative accounting.

The second section gives an overview of the research methodology applied. The third section is dedicated to empirical research of potential tax evasion on a sample of 45 micro-companies in Serbia, including the presentation of the results obtained through research. The last section deals with conclusions reached.

2. INCOME TAX AND CREATIVE ACCOUNTING

Corporate income tax is one of the most significant forms of public revenues but its tax balance amount can't measure up to value-added tax and excise tax but still, it serves a development and stabilisation purpose. The income tax levied on legal entities in Serbia is called corporate income tax in all OECD member states.

According to provisions of the Law on Corporate Income Tax, a taxpayer is a legal entity i.e. company organised in one of the following forms: joint-stock company, limited liability company, partnership, limited partnership, public enterprise and cooperative which generate revenues by selling products/services on the market, and other legal entities, including non-profit organisations which are not organised in the abovementioned forms if it generates revenues from selling products on the market or provision of services for a fee.

In Serbia, there is no inspection envisaged for sole traders who are subject to lump-sum taxation. Tax administration once a year imposes a fixed amount of taxes and contributions payable by these sole traders/stores who are not required to keep business books, except KPO form, i.e. sales book. For this reason, such stores are frequently exploited for money laundering and other kinds of white-collar crimes. Namely, the owners of larger profitable companies open stores, subject to lump-sum taxation, in other people's names which issue invoices for services not provided. Then, the store is paid for such services from the company's bank account. Afterwards, the sole trader withdraws cash from his bank account, without providing any justification to the state as the law entitles him to cash withdrawals up to 150,000 RSD a day.

Rulebook on independence test for sole traders, effective from 1 January 2020, determines the position of the sole trader in a relationship with the company he works for. The inspection into the independence of sole traders was about to be conducted by the tax administration but the pandemic and the onset of the economic crisis have certainly largely compromised the efficiency of inspection of stores and small-sized enterprises.

Regarding the improvement of efficiency of tax administration in the period from 2008. to 2017., taxpayers, tax administration personnel and other employees have improved their knowledge to ensure efficient communication with Tax Administration electronically.



MSMEs are taxpayers and therefore subject to payment of taxes. Tax administration pays most attention to medium and large enterprises as large sums of money are involved in their operations and therefore the “creative accounting” is expected to be put to use.

Creative accounting has been long and widely in use in our country. Company owners and managers wish to present to the public a better image of the company i.e. to demonstrate high quality and good performance. A lot of attention has been invested in curbing creative accounting and we have seen frauds involving fake financial reporting both elsewhere in the world and domestically. (Škarić, 2007). Kaparavlović claims that creative accounting is used to make the financial results such as they would please the company i.e. to deviate from true and fair presentation (Koletnikć, 2011.). American Institute of Certified Public Accountants (AICPA) claims that creative accounting is a deliberate disclosure of inaccurate amounts or hiding of amounts in the financial statements. Creative accounting implies modifications to all accounting records, transactions and documents used in the preparation of financial statements; presentation of inaccurate transactions for certain accounts or failure to disclose transactions, as well as misapplication of accounting rules (Diekmann, & Ben, 2010).

In the beginning, all companies' efforts to manage income are legal, legitimate and within the applicable financial reporting framework. They arise from the liberal shaping of accounting policy which is allowed under flexible accounting principles and standards, alternative accounting methods and the need for professional judgement. Over time, the use of accounting techniques applied to manage profit is rare at first, of low value and within the financial reporting framework, but then it broadens to include unallowed, illegal techniques which are contrary to the generally accepted accounting principles, regulations and other applicable legislation. This is the turning point at which “cooking the books” becomes illegal and grows into forgery of financial statements (Milojević, 2015).

The tax base for the corporate income tax is taxable profit. Taxable profit is determined in the tax balance by reconciling the taxpayer's profit disclosed in the income statement, presented in compliance with IAS i.e. IFRS and legislation governing the area of accounting and auditing. To determine the amount of taxable profit, the expenses are recognized in amounts disclosed in income statements in compliance with IAS i.e. IFRS and legislation governing the area of accounting and auditing, except as otherwise prescribed by law.

Income tax is calculated for the tax period which is equal to a business year i.e. calendar year. The corporate income tax rate is pro-rate, uniform and currently stands at 15%. The taxpayer is obliged to file to the competent

tax authority a tax return which includes the calculation of taxes and tax balance of the period for which taxes are accrued. In addition to the tax return and tax balance, the taxpayer is obliged to submit to the tax authority financial statements (balance sheet, income statement (P&L), cash flow statement, changes-in-equity statement, etc.) and other documentation prescribed by regulations. The tax return is due for submission within 10 days after the expiry of the deadline for submission of financial statements. In the tax return, the taxpayer is obliged to specify the amount of income tax for the tax period such tax returned in filed for.

3. METHODOLOGY

Benford's Law is one of the most common techniques for detecting anomalies and irregularities in accounting data. Its purpose is to analyse patterns of digits in numbers sets (Coderre, 2009).

Benford's law i.e. Benford's analysis was first discovered by Newcomb in the late 19th century, who was the first to notice that smaller digits tend to appear more frequently than larger digits in the sets of numbers. The Newcomb noticed that the first digit has the greatest prevalence which led him to conclude that the probability of the digit d as the first digit in any data set is equal to $\log_{10}(1+d) - \log_{10}(d)$, for all $d \in \{1,2,...,9\}$. Frank Benford noted the same phenomenon in 1938 when he carried out a thorough analysis of data sets and calculated the exact number of times the first digit appears, and other digits as well. He discovered a logarithmic distribution which governs the distribution of digits. Benford's law was named after Frank Benford (Milojević, et al., 2014).

Benford's law was deemed capable of detecting errors and frauds in financial statements based on the frequency of any digit in any given data set i.e. in financial statements. If the data set included in the financial statements does not follow this law, it can give rise to the conclusion that there could be an error present in data or that the company committed fraud (Milojević, et al., 2014).

The first article proposing the use of Benford's law as a means of finding frauds was published by the economist Hal Varian in 1972. Varian's idea was to compare the first two digits to see if any anomalies are present. Several years later, more precisely in 1999, Mark Nigrini published his research into how forensic accountants and auditor may apply Benford's law to detect indicators that potential creative accounting techniques have been used or that misrepresentations are present in financial statements. (Collins, 2017)



Numerical data collected in practice are modelled to-day by using random variables. Benford's law can be presented by designating random variable as X , and its first significant digit as $D_1(X)$. Benford assumed that the probability of distribution of the significant digit will follow the equation: $P(D_1(X) = d) = \log_{10}(1 + 1/d)$, for all $d \in \{1, 2, \dots, 9\}$. (Basrak, 2003).

If the data are taken from different orders of magnitude in one set, there is a probability that the set will obey Benford's law. Data that do not obey Benford's law are generally fictitious data, such as phone numbers and data used in students experiments. (Milojević, et al., 2014.) Abnormalities are noticeable if data do not obey the law i.e. in case of any deviations from the law which, more specifically, lead to the conclusion that there may be fraud or error present in the financial statements. The development of information technology has made the fraud detection technique i.e. Benford's law easily applicable using adequate software.

The role of Benford's law is to help forensic accountants and auditors in detecting anomalies in financial statements. They are under obligation to report any error or criminal offence to the company's management. (Mikerović, et. al, 2012)

According to Benford's law, we should know the following: (Milojević, et al., 2014):

A. Distribution frequency of the first digit corresponds to the following algorithm equation:

$$F_a = \log_{10} \left(1 + \frac{1}{n} \right) \quad (1)$$

Where n is the significant decimal digit other than 1, 2, ..., 9.

B. Other digits

In numbers beginning a decimal digit n, z

$$F_b = \frac{\log_{10} \left(1 + \frac{nz + 1}{nz} \right)}{\log_{10} \left(\frac{n+1}{n} \right)} \quad (2)$$

Where z may be 0, 1, 2, ..., 9.

C. Benford's law on arbitrary numbers

The number beginning with decimal numbers $abc...opq$,

$$\log(1+x) \approx \left(x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots \right) \text{Taylor series} \quad (3)$$

$$\log(1+x) \approx \left(x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots \right) / \log(10) \quad (4)$$

$$F_q = \frac{\log_{10} \left(\frac{abc...opq+1}{abc...opq} \right)}{\log_{10} \left(\frac{abc...op+1}{abc...op} \right)} = \frac{\log_{10} \left(1 + \frac{1}{abc...opq} \right)}{\log_{10} \left(1 + \frac{1}{abc...op} \right)} \approx \frac{abc...op}{abc...opq} \rightarrow \frac{1}{10},$$

(5)

for growing q

There is a slight difference between the distribution frequency in leading digits, so the calculation should be used instead of $\log_{10}p(x)$, $\log_{10}(1+x)$.

The analysis was based on financial statements available on the website of the Serbian Business Registers Agency. To ensure easier processing of the chosen items from tax balance sheets, we converted them into MS Excel and then transferred to module ACL (Audit Command Language) to check Benford's Law in Practice.

4. DATA AND RESULTS

The research covered 45 MSME in Serbia over 3 years (2017, 2018 and 2019). The goal of this research is to determine whether Benford's law could help detect the tempering of the figures in the financial statements of the selected companies and identify any frauds or misrepresentations present in them. Using Microsoft Office Excel program we sorted the data taken from financial statements into tables. In this paper, we shall analyse the following items of the income statement: operating profit and net income. Data are sorted into a table, a certain number of companies had nothing to show under the analysed items or the items showed only negligible sums.

To determine whether the items obey Benford's law, each item must be analysed separately. For each item, the following must be determined: the first two digits, the first digit only, the second digit only, the third digit only and finally, the last two digits from the sample.

When the digits are isolated, a separate table is prepared to demonstrate the difference between the actual digits and digits obeying Benford's law. Afterwards, z statistics was applied to calculate whether the difference is statistically significant.



Table 1. Benford's law applied to operating profit

First	Count	Actual	Benford' Law cumulative	AbsDiff	Z-stat
1	11	24.44%	30.10%	0.123251	0,356
2	7	15.56%	47.71%	0.298025	2.5720
3	6	13.33%	60.21%	0.576423	1.321
4	5	11.11%	69.90%	0.65024	0.826
5	5	11.11%	77.82%	0.628462	1.121
6	4	8.89%	84.51%	0.805684	0.325
7	3	6.67%	90.31%	0.785961	0.684
8	3	6.67%	95.42%	0.751945	1.391
9	1	2.22%	100.00%	0.897928	0.526
	45	100%	100.00%	MAD=0.536751	

Source: Author

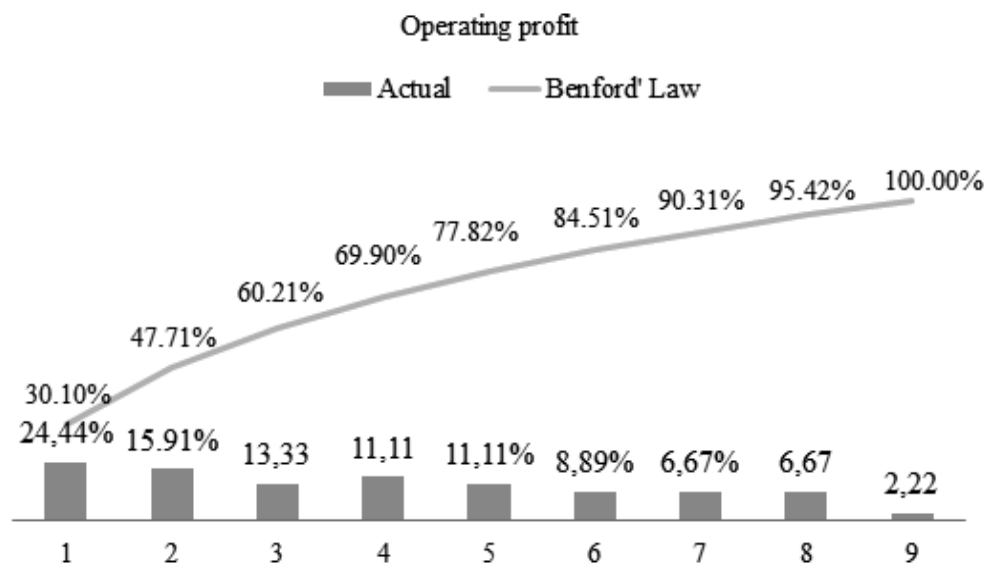


Figure 1. Distribution of the first digits in the item of operating profit

The diagram of the actual number and Benford's law makes it evident that there are big differences between these two items showing an operating profit. Out of 45 micro-enterprises, 11 of them start with digit 1, which is 24.44% of the total number of enterprises covered by the analysis. According to Benford's law, the expected distribution of the digit 1 is 30.1% which means that this deviation is significant because it demonstrates the gap between the actual number and the number obeying Benford's law which should call for additional verification of the item of operating profit for all 45 Serbian micro-enterprises covered by the analysis. This need not necessarily indicates malpractice or fraud in respect of the item of operating profit, however, since Benford's law is such that its curve

behaves otherwise i.e. its direction is the opposite, this diagram shows a significant deviation and that, though we could have expected the digits from 2 to 9 to decrease they are actually increasing in frequency. This, however, is a telltale sign that verification should be undertaken to determine whether the financial statements were subject to tampering or an error.

The following table represents the analysis of Benford's law for the net income which differs significantly from the operating profit and are more proximal to real-life results which are obtained when Benford's law is applied.

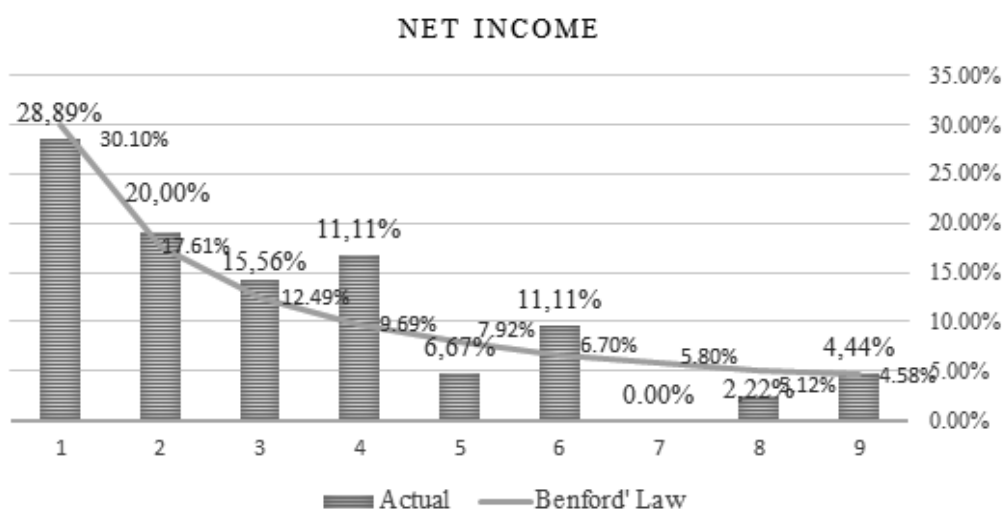
**Table 2.** Benford's law applied to net income

First	Count	Actual	Benford' Law	AbsDiff	Z-stat
1	13	28.89%	30.10%	0.01623	0.0342
2	9	20.00%	17.61%	0.01348	0.1024
3	7	15.56%	12.49%	0.02091	0.9734
4	5	11.11%	9.69%	0.07906	0.3345
5	3	6.67%	7.92%	0.03066	0.2687
6	5	11.11%	6.70%	0.02917	0.8641
7	0	0.00%	5.80%	0.05689	0.2626
8	1	2.22%	5.12%	0.02694	0.0402
9	2	4.44%	4.58%	0.00202	1.0624
	45	100%		MAD=0.028478	

Source: Author

Based on the table showing net income, we see significant differences in comparison to operating profit. The table clearly shows that there are very small differences between the actual number and the number obeying Benford's law. In comparison to operating profit, we see that the digits are distributed in compliance with Benford's law

i.e. digit 1 has distribution frequency of 28.89%, digit 2 has distribution frequency of 20.00% and this percentage decreases towards digit 9 which follows Benford's law. The following diagram shows the curve of Benford's law to see whether there are any deviations in certain digits within the data set.

**Figure 2.** Distribution of the first digits in the net income item

What we can conclude is that the difference between the actual digit and the digit obeying Benford's law is very small thus indicating that the net income of micro-enterprises behaves in compliance with Benford's law except for certain digits, but these differences are negligible. The first thing we note is that digit 1 has the frequency distribution of 28.89%, digit 2 - 20.00% compared to Benford's law which indicates that the digits obey the law from 1 to 9.

Digits which do not obey Benford's law are 4, 6 and 9 because they deviate from the Benford's curve i.e. the actual number deviates from Benford's law. This result can be very useful to auditors of financial statements, forensic accountants and internal auditors, who are very scarce in our country because forensic accounting and forensic audit are very poorly developed in Serbia.



The analysis of 45 micro-enterprises leads us to the conclusion that the position of net income i.e. numbers 4, 6 and 9 disagree with the theoretical distribution which demonstrates the necessity to carry out more detailed tax examination and to test whether "creative accounting" was used. Of course, one can hardly avoid the fact that some companies do not make this error unintentionally.

5. CONCLUSION

Based on the analysis of financial statements of 45 micro-enterprises in Serbia, we may conclude that Benford's law can be used to identify deviations in digits in the data sets. Significant deviations were identified in disclosed values in the income statement and the expected theoretical distribution. The fact that 7 out of 9 actual digits did not obey Benford's law provides a reasonable basis for us to give recommendations to tax authority to inspect in detail financial statements of micro-enterprises, paying special attention to the offsetting of income and expenses and the disclosure of operating profit.

Analysis of the net income revealed that the data obeyed Benford's law except for minor deviations that can be checked by accountants. Detailed reviews and analyses are required to determine with certainty whether the deviations are the result of fraud or error present in the financial statements. Based on all of the foregoing, we can say that Benford's analysis does not suffice for detailed examination whether income statements and net income were tampered with or the consequence of employees' errors, but its usefulness in checking doubtful items and pursuing further analyses by accountants, tax inspectors and auditors is beyond doubt.

6. ACKNOWLEDGMENT

This paper is part of the project No. 22010083 entitled "Experience sharing of Visegrad countries to tax avoid activity" financed by the International Visegrad Fund.

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CORPORATE TAX REPORTING: EFFECTIVE TAX RATE OF SERBIAN PUBLIC ENTITIES

Vule Mizdraković^{1*},
Maja Kljajić^{1,2},
Marija Slavković³

¹Singidunum University,
Belgrade, Serbia

²PhD candidate
Singidunum University,
Belgrade, Serbia

³MS Finance & Accounting,
Belgrade

Abstract:

The main purpose of this paper is to analyze the correlation between financial (accounting) result in income statement and tax result in tax report. Calculation of corporate income tax expense is a complex procedure which requires the use of legal tax regulation. As a result, legal entities could report profit in their financial statements, and do not have income tax expense at the same time. Research sample consists of randomly selected 322 business entities and their annual reports from Belgrade Stock Exchange for 2017. The results of the research show that average effective tax rate of sample entities is app. 12%, while median is app. 9%.

Keywords:

corporate tax, financial reporting, effective tax rate, loss and profit before tax.

1. INTRODUCTION

The structure of the state's tax system is an important determinant when it comes to the economic performance of a state. Each tax system has three basic objects of taxation, namely: consumption, income and property (The Government of the Republic of Serbia, 2020), (Aleksic, 2019). When it comes to consumption, there are the following taxes: VAT (as a general consumption tax), excise duty and tax on non-life insurance premiums. On the other hand, corporate income tax and personal income tax are taxes related to income. When it comes to property, the following taxes are distinguished: property tax; inheritance and gift tax; tax on the transfer of absolute rights; and taxes on the use, possession and carrying of goods. Research subject of this paper is the corporate income tax of business entities and differences between financial result disclosed in income statement and tax result disclosed in tax statement. Although the corporate tax has a significant impact on a country's economy, it brings in a relatively low amount of tax revenue for most governments. The paper will present the procedure for calculating corporate income tax in the Republic of Serbia, and the results of the research will show the average effective profit tax rate of the sampled public companies.

2. CHARACTERISTICS OF CORPORATE INCOME TAX CALCULATION IN SERBIA

According to the Law on Corporate Income Tax, a taxpayer is an entity established for the purpose of performing different activities and gaining profit. A taxpayer is also a cooperative that generates income by selling products on the market or performing services for a fee.

Correspondence:
Vule Mizdraković

e-mail:
vmizdrakovic@singidunum.ac.rs



According to this law, taxpayer is also another legal entity that is not established to gain profit, but to achieve other goals, but only if it earns profit by producing and selling products or if it provides services for a fee. The Law on Corporate Income Tax defines a wide range of legal entities that are obliged to pay corporate income tax (Official Gazette of the Republic of Serbia, 2019).

2.1. Calculation of the tax base and tax rate

Taxable profit is determined in the tax statement by adjusting the taxpayer’s financial result disclosed in the income statement. That result is calculated in accordance with International Accounting Standards (IAS), i.e. International Financial Reporting Standards (IFRS), and International Financial Reporting Standard for Small and Medium Legal Entities (IFRS) for SMEs) and regulations governing accounting, in the manner prescribed by the Law on Accounting. Taxable profit of a taxpayer who, according to the accounting regulations, does not apply IAS (i.e. IFRS and IFRS for SMEs), is determined in the tax balance by adjusting the taxpayer’s profit, calculated in accordance with the method of recognition, measurement and assessment of income and expenses prescribed by the Minister of Finance.

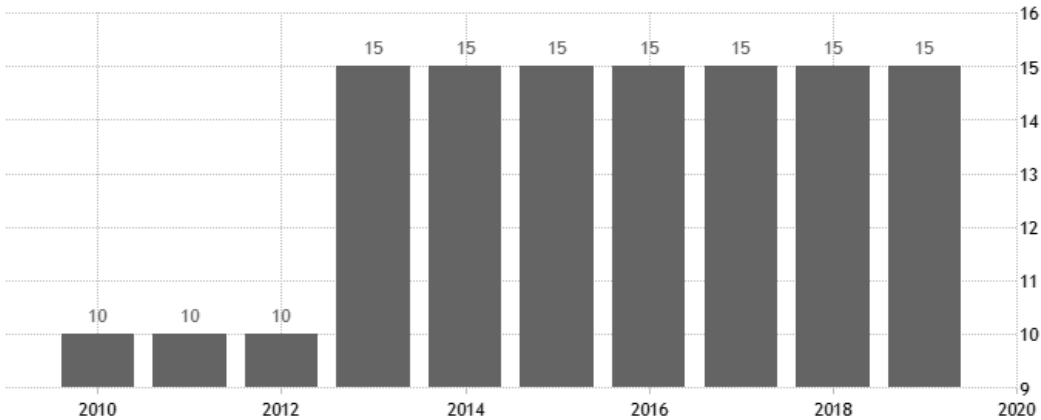
The taxpayer is obliged to calculate and pay income tax disclosed in the tax return for reporting period. However, the tax is paid in advance according to the amount of tax from previous period. Therefore, if the taxpayer paid less than he/she is obliged to pay according to the amount disclosed in the tax return, he is obliged to pay the difference no later than the filing date of the tax return (and submit a proof of payment of the tax difference).

Sometimes taxpayers can pay more than they are later obliged, therefore the overpaid tax will be used as an asset for the next tax period; or it will be refunded within 30 days from the date of receipt.

The taxpayer is obliged to submit tax return to the tax authority in charge, for the period for which the tax is determined. The tax return is submitted within 180 days from the expiration of the period for which the tax is determined. All states impose income taxes, but rates and bases vary greatly between them. There are numerous implications of high or low income tax rate. Namely, income tax reduces the rate of return on income tax after tax, thus increasing the cost of capital, which leads to lower levels of investment and economic production. In addition, high income tax rate leads to lower wages, lower investment returns and higher final prices of goods and services. In the case of the Republic of Serbia, the corporate income tax rate is proportional and uniform and amounts to 15%. The tax period for which income tax is calculated is a business year.

The following table will show the trends in income tax rate in the period 2010-2019.

Table 1. Trends in income tax rate in the period 2010-2019



Source: (Trading Economics , 2020)

When it comes to other countries, income tax rates differ among them and each one is determined based on the power of economy and fiscal politics of the country.

As a result, some countries have 0% income tax rate, while in others legal entities will have to reserve one third of their earned profits to pay income tax.



Table 2. Corporate income tax rates by countries and territories

Corporate tax rates	Countries and territories
0%	Anguilla, Bahamas, British Virgin Islands, Bahrain, Latvia, Bermuda, Isle of Man, Cayman Islands, Georgia, Guernsey, Jersey, Kuwait, Latvia, Saint Kitts and Nevis, Sark, United Arab Emirates
5%	Saudi Arabia
8%	Hong Kong ¹ , Maldives ²
9%	Hungary, Montenegro
10%	Andorra, Bosnia and Herzegovina, Bulgaria, Gibraltar, Morocco ³ , Mongolia, North Macedonia, Paraguay, Qatar, U.S. Virgin Islands
12%	Macau, Moldova, Canada ⁴ , Croatia ⁵ , Uzbekistan ⁶
13%	Cyprus, Ireland, Liechtenstein, Tajikistan ⁷
15%	Iraq, Lithuania, Mauritius, Oman, Palestine, American Samoa ⁸ , France ⁹ , Sri Lanka ¹⁰
16%	Romania
17%	Lebanon, San Marino, Singapore, Azores, India ¹¹
18%	Belarus, Switzerland, Ukraine, Malaysia ¹²
19%	Czech Republic, Poland, Slovenia, United Kingdom, Algeria ¹³
20%	Afghanistan, Armenia, Azerbaijan, Brunei, Cambodia, Fiji, Finland, Iceland, Jordan, Puerto Rico, Russia, Taiwan, Thailand, Vietnam, Yemen, Estonia, Cook Islands ¹⁴ , Kazakhstan, Netherlands ¹⁵
21%	Portugal, Sweden, United States ¹⁶
22%	Botswana, Curacao, Denmark, Slovakia, Syria, Turkey
23%	Israel, Norway, Egypt ¹⁷
24%	South Korea
25%	Aruba, Austria, Cape Verde, Dominica, Ecuador, Guatemala, Indonesia, Iran, North Korea, Liberia, Panama, Senegal, Trinidad and Tobago, Uruguay, China, Nepal ¹⁸ , Spain ¹⁹
26%	Bhutan, Falkland Islands
27%	Chile, Dominican Republic
28%	Burkina Faso, Eswatini (Swaziland), Greece, Italy, Monaco, New Zealand, South Africa
29%	Bolivia, Luxembourg
30%	Angola, Argentina, Belgium, Central African Republic, Cook Islands, Congo, Costa Rica, Cuba, El Salvador, Germany, Guyana, Haiti, Japan, Kenya, Mexico, New Caledonia, Nigeria, Peru, Philippines, Rwanda, Tanzania, Tunisia, Uganda, Australia ²⁰ , Seychelles ²¹
31%	Gambia, Pakistan
32%	Cameroon, Namibia
33%	Colombia, Jamaica ²²
34%	Brazil, Venezuela
35%	Bangladesh, Benin, Burundi, DR Congo, Gabon, Malta, Zambia, Zimbabwe
36%	Suriname

Source: (Dharmapala & Hines, 2009), (Bunn & Asen, 2019), (Ministry of Finance - Estonian Tax and Customs Board, 2019), (Deloitte, 2020), (KPMG, 2020)

1 16.5% (on profits over HK\$2 million); 8.25% (on profits not over HK\$2 million)

2 8% lowest rate; 15% highest rate

3 10% lowest rate; 31% highest rate

4 12% lowest rate; 38% highest rate

5 12% for profits not over 3 million kn, 18% for profits over 3 million kn

6 20% banks and mobile communication operators

7 25% non-residents

8 15% lowest rate; 44% highest rate

9 31% on profits over €500,000; 28% over €38,120 but not over €500,000; 15% not over €38,120

10 5% lowest rate; 30% highest rate

11 17% lowest rate; 25% highest rate

12 18% lowest rate; 24% highest rate

13 19% lowest rate; 26% highest rate

14 20% lowest rate; 30% highest rate

15 25% on profits over €250,001; 20% not over €250,000

16 21% + 0 – 12% (state/local)

17 22.5% on taxable corporate profits; + 5% on distribution of profit

18 30% higher rate for financial companies; 25% (standard rate); 20% reduced rate for manufacturing companies; + 5% on profit distribution + 10% mandatory bonus to employees

19 4% in Canary Islands

20 28.5% reduced rate

21 40% highest rate; 30% lowest rate

22 25% reduced rate for small companies



3.1. Adjustments of expenses

The amounts of expenses disclosed in income statement will not be recognized in tax report, in following cases:

- undocumented costs;
- value adjustments of individual receivables from the person to whom it is owed at the same time, up to the amount of the obligation to that person;
- gifts and donations given to political organizations;
- gifts whose recipient is a related party (entity);
- interest costs due to late payment of taxes, contributions and other public duties;
- costs of the procedure of forced collection of taxes and other debts, costs of tax misdemeanor proceedings and other misdemeanor proceedings conducted before the competent authority;
- fines imposed by the authority, contractual penalties and other penalties;
- default interest between related parties;
- costs that were not incurred for the purpose of performing business activities, unless otherwise regulated by this Law.

The following is recognized as an expense in tax report (even if not recognized in income statement):

- cost of materials and cost of goods sold are recognized in amounts calculated using the weighted average cost method or the FIFO method;
- salary costs, i.e. salaries, are recognized in the amount calculated at the expense of operating expenses;
- employee benefits that are considered earnings, including benefits that are not subject to payroll taxes up to the amount prescribed by law, are recognized as an expense in the tax balance in the tax period in which they were paid or realized;
- accrued severance and cash benefits to an employee in case of retirement and termination of employment on another basis, are recognized as an expense in the tax report in the tax period in which they are paid;
- depreciation of fixed assets is recognized as an expense in the amount and in the manner determined by law
- loss from the sale of individual receivables in the amount stated in the income statement, in the tax period in which the sale of these receivables was made.
- total accrued interest, excluding interest due to late payment of taxes, contributions and other public duties;
- taxes, contributions, fees and other public duties that do not depend on business results, which are paid in the tax period;

- long-term provisions for the restoration of natural resources, in the amount of costs within the warranty period and retained collateral and deposits, as well as other mandatory long-term provisions;
- other long-term provisions that meet the conditions for recognition in accordance with IAS, ie IFRS and IFRS for SMEs, in the amount of used amounts of these provisions in the tax period;
- impairment of assets, which is determined as the difference between the net present value of assets and its estimated recoverable amount, but are recognized in the tax period in which the asset is disposed of or used;
- double amount of costs that are directly related to research and development performed by the taxpayer.

However, some expenses could be recognized in tax report, but only in the proscribed amount. For example, following expenses are recognised in the total amount of up to 5% of the total revenues:

- expenditures for health, educational, scientific, humanitarian, religious and sports purposes, environmental protection, as well as benefits made to institutions or providers of social protection services;
- expenditures for humanitarian aid, i.e. elimination of consequences incurred in case of emergency;
- expenditures for investments in the field of culture, including cinematographic activity.

On the other hand, membership fees to chambers, federations and associations are recognized as an expense in the tax report up to a maximum of 0.1% of total income. Also, representation expenses are recognized as an expense in the amount of up to 0.5% of total income.

3.2. Adjustments of revenues

Revenues earned in the form of dividends and profit share by a resident taxpayer are not included in the tax base. Revenue earned by a resident taxpayer from interest on debt securities issued by, the Republic, an autonomous province, a local self-government unit or the National Bank of Serbia; is not included in the tax base. In addition, revenue that a resident taxpayer, established in accordance with the regulations governing investment funds, realizes on the basis of the alienation of property is not included in the tax base. Revenue arising from unused long-term provisions that were not recognized as an expense in the tax period, in which they are recognized, is not included in the tax base in the tax period in which they are reported.



4. EFFECTIVE TAX RATE

The effective tax rate represents the actual tax liability of the corporate taxpayer. This financial indicator is calculated by dividing the calculated income tax and profit before tax. It is important to note that in entities with a negative amount of profit before tax (loss before tax), it is not possible to calculate the effective tax rate (Knezevic, Stanisic, & Mizdrakovic, 2019). The effective tax rate may be higher or lower than the legal (nominal) corporate income tax rate. The difference may arise due to various adjustments, previously mentioned, to the financial result prescribed by the Law on Corporate Income Tax in order to arrive at the amount of taxable profit.

The effective tax rate is an indicator of the company's success in managing the costs of corporate income tax. In order for a company to achieve an optimal effective tax rate, it needs a tax strategy that will be fully in line with its business goals and plans, as well as with the requirements of legal regulations (PwC Serbia, 2020).

5. RESEARCH METHODOLOGY AND RESULTS

For the purposes of this paper, 322 business entities and their annual reports from Belgrade Stock Exchange (BELEX) were randomly selected. It can be assumed that public companies show higher responsibility in terms of tax settlement, including profit tax, than other entities. Therefore, this research will be focused on their business practice. Financial reports were collected from the database of the Serbian Business Registers Agency (SBRA, 2018) for 2017 as a reporting period. The research analyzed the information presented in income statement, with following statement items in focus: profit before tax, loss before tax, tax expense for the period and the calculated effective tax rate.

As previously mentioned, the financial (accounting) result from the income statement represents the basis for calculating the tax amount in the tax balance. The results of the research show that the largest number of companies has a positive financial result, about 62% of the total number of sampled companies. On the other hand, there are 123 companies with a loss before tax, i.e. companies that have higher expenses than income.

The total amount of profit before taxes of these companies is €482,635,170. Based on that, it can be assumed that the tax authorities will collect a total of 72,395,276 euros. However, as mentioned above, due to the adjustment of revenues and expenses in the tax balance, the tax base will probably not be equal to financial result, as well as the amount of collected income tax. The results show that total amount of tax expense of sample companies equals to €64,302,251, which is less than expected amount of

collected tax by app. 11%. The following table will show the number of companies in relation to the loss / profit before tax.

Table 3. Profit / Loss before taxes of sampled companies

	Number of Entities	Percentage
Loss before Tax	123	38,20%
Profit before Tax	199	61,80%
Total	322	100%

The table below shows the companies from the sample according to whether they have a positive or negative financial (accounting) result in relation to a positive or negative tax result. The basic idea is to show the number of companies that made a loss in the income statement, but after adjustments of revenues and expenses in the tax report recorded a positive tax result, i.e. were obliged to pay a certain amount of income tax. There are only 6 such companies (almost 5% of the total sample). On the other hand, there is far higher number of companies that made a profit before tax in the income statement, but avoided paying income tax after correcting income and expenses in the tax report. There were about 40% of such companies in the total sample.

Table 4. Connection between financial and tax result of sample entities

	Number of Entities	Out of total number of entities with negative/positive financial resu
Entities with negative financial result and positive tax result	6	4,88%
Entities with positive financial result and negative tax result	80	40,20%

In the case of the first group of companies, the previous part of the paper lists expenses that are not recognized, or are recognized in a partial amount, which leads to an increase in the tax base for the reported amounts. That leads to the situation that after all adjustments a certain company will report tax profit and a tax expense, although financial result in income statement is negative.

When it comes to the second group of companies, it can be noticed that there are 80 companies (40.20%) that reported profit before tax in income statement, but do not have the obligation to pay income tax. Namely, adjustments lead to a reduction of the tax base, because some revenues are not tax recognized.



Also, companies that have had a tax loss in some of the previous five years (reporting periods), and have a reported profit in current reporting period, can use that tax loss to reduce the tax base. Therefore, total loss from previous years reduces the entire corporate income tax base and tax expense will be equal to zero. Also, it is necessary to remind that the management of companies using the techniques of positive and negative creative accounting can show the profit before tax in the income statement, in

order to achieve the planned goals, while avoiding paying taxes. In any case, the percentage of these companies in relation to the total number of sampled companies is rather high (especially if we take into account the number of companies that made a profit before tax, 199 entities).

Finally, the table below shows the results of descriptive statistics when it comes to the effective tax rate of the companies in the sample.

Table 5. Data on the calculated effective tax rate of the sampled companies

Mean	Standard Error	Median	Standard Deviation	Sample Variance	Kurtosis	Skewness	Range	Min	Max
0,1209	0,0125	0,0866	0,1763	0,0311	17,9189	3,3869	1,4222	0	1,4222

It can be noticed that the average value of the effective tax rate is 12.1% and that it is lower compared to the nominal tax rate of 15%. This means that the obligation to pay corporate income tax from the sample is on average lower by almost 3% compared to the nominal one. However, the median value of effective income tax rate could be used to present the situation more realistically. Namely, this number divides the sample exactly in half and indicates that in this case there are more companies above the middle. The reason for that are companies outliers with very high profit tax rates (maximum value of tax rate is 142.22%, but the absolute value of tax is very low). Therefore, if median is chosen as the average value, it can be concluded that the companies from the sample have an effective tax rate averaging 8.66%.

6. CONCLUSION

The main purpose of this paper is to point out the specifics of the tax system of the Republic of Serbia. For the purposes of the research, 322 business entities whose shares are listed on Belgrade Stock Exchange in the Republic of Serbia for 2017 were randomly selected. Research results show that the largest number of companies has a positive financial result, about 62% of the total number of sampled companies, while the remaining (app. 38%) are companies with a loss before tax. On the other hand, the results of the research show that there are a number of companies that have a profit before tax, but do not have the obligation to pay taxes and vice versa. When it comes to effective tax rate, it was noticed that it amounts to 12.1%, which is a lower rate compared to the nominal one. However, if the median for the average value is taken into account, the results of the research show that sampled entities in the territory of Serbia have an effective tax rate of 8.66% on average.

Future research could be focused on more detailed analysis of the taxpayer's profile in terms of its size, legal form, total value of assets, age of the company and other characteristics.

7. ACKNOWLEDGMENT

This paper is part of the project No. 22010083 entitled "Experience sharing of Visegrad countries to tax avoid activity" financed by the International Visegrad Fund.

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RISK ANALYSIS AS A FUNDAMENTAL ELEMENT OF THE CAPITAL GROUP'S TRANSFER PRICING POLICY

Karolina Kuropka

Wroclaw University of
Economics and Business,
Wroclaw, Poland

Abstract:

The article presents the risk analysis of transactions concluded between related entities as an essential element of the capital group's transfer pricing policy. Risk has been presented as a phenomenon that occurs in every business activity. The importance of its identification for making both operational and strategic decisions by related entities was pointed out. Attention was paid to the significance of verification of potential areas determining the risk in question and ways to limit it. In addition, elements of transfer pricing policy have been presented which should be followed by related entities to limit the negative effects of risk. It was emphasized that creating a transfer pricing policy in the capital group and knowledge of certain tax tools is only a starting point for their proper application, which depends on the assumed goals of the group of related entities and the conditions under which transactions are carried out.

Keywords:

tax law, risk management, transfer prices, transfer pricing policy.

1. INTRODUCTION

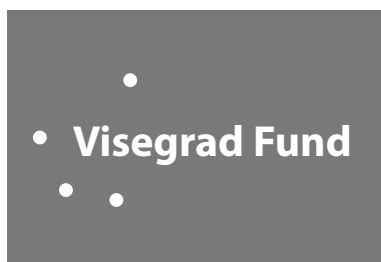
Today, an increasing part of world trade takes place within capital groups. This way of doing business, besides many positive aspects resulting from possible synergy of activities, poses a huge organizational challenge. In addition, the fact that transactions between these entities are subject to the obligation to set prices according to market conditions cannot be ignored.

Issues related to the correctness of determination of the transfer price have become in recent years one of the most important areas of interest for tax authorities around the world. This is due to the need to monitor transactions that may lead to erosion of the tax base. In this respect, related parties, when making decisions on the course of transactions, use specific tools, the application of which makes it possible to limit the risk of setting a price deviating from market principles. One of them is the transfer pricing policy, the aim of which is to properly shape, from the point of view of the company's objectives as well as tax regulations, the rules of executing transactions between related parties. Its crucial element is a properly constructed, logically consistent functional analysis of the transaction, which should in particular take into account the assets involved and the risks incurred by its participants.

The purpose of the publication is to present the essence and scope of the transfer pricing policy, including in particular the risk element in a transaction with an affiliated entity. The article presents the principles of developing this policy. Attention was drawn to the necessity of taking into account not only the conditions of the tax law, but also the organizational conditions resulting from the specificity of the capital group.

Correspondence:
Karolina Kuropka

e-mail:
karolina.kuropka@ue.wroc.pl





The legal regulations and the literature on the subject lack a comprehensive list of necessary elements of the transfer pricing policy, and the requirement of its possession in particular countries is an obligation imposed by the legislator, e.g. in Poland and the Czech Republic, the fulfillment of which is a practical problem for capital groups. These issues have been linked to an element of risk borne by affiliated entities. Moreover, the article proposes a solution for determining its amount by the participants of the transaction. The article uses research methods such as literature studies and analysis of accounting documentation of capital groups.

2. THE ESSENCE OF TRANSFER PRICING POLICY

The transfer pricing policy is a tool that defines the action in the field of transactions with affiliated entities, determined by the decision center, aimed at achieving the objectives of the capital group as a whole through the transfer of goods between these affiliated entities. These objectives should be primarily consistent with the superior arm's length principle. Therefore, it can be concluded that the transfer pricing policy is one of the management tools between the affiliated entities for the accomplishment of certain objectives and tasks of a higher degree while maintaining the arm's length principle.

Its primary role is to properly present the existing relations within the capital group, identify added value chains and present the methods of calculating the remuneration received as part of intra-group transactions. (Stone i in., 2020) It is worth emphasizing that the transfer pricing policy does not have to have a formalized form, e.g. in the form of a prepared document. These can only be verbal arrangements determining the rules of the transaction. However, some of the authors, e.g. J. Mika, claim that due to the fact that it is a basic tool that can be used to manage transfer pricing risk in a group of affiliated entities, it is appropriate to develop it in a formal manner. (Mika, 2019) Moreover, such a document should contain information concerning, among others, the way of documenting transactions, information on data circulation in the group, assignment of specific tasks concerning transfer pricing risk management by particular entities, verification and control of adopted assumptions, compliance of transfer pricing with tax regulations. It should be noted that the guidelines concerning the content of the transfer pricing policy were included in BEPS reports. The issues concerning the relation between the process of creating added value in the group and the transfer pricing policy have been defined primarily in Actions 8-10

It should be emphasized that the intention of the transfer pricing policy is, from the point of view of the company's objectives, as well as tax regulations, appropriate shaping the principles of transactions between affiliated entities, carried out through the following processes:

- standardization of the transaction execution process,
- standardization of the valuation of asset or benefit transfer, and,
- standardization of principles and rules for control of transaction execution. (Stamblewska-Urbaniak & Zbroiński, 2019)

The implementation of the indicated processes rests with the person the transfer pricing policy is addressed to, in particular the management of the capital group, the management of individual related entities, the staff of financial departments (divisions), the staff of operational departments (divisions) and the staff of human resources management departments. (Kaniewska-Środecka, 2018)

Undoubtedly, depending on whether the capital group functions as an operating, management or financial group, the scope of standardization of transfer pricing principles in the transfer pricing policy may vary. Greater transparency of operations can be expected in an operational capital group, which will result in detailed price calculation methods and applied margins. In the management and financial group, due to greater autonomy of companies' operations, as well as the desire to protect business secrets, there may be greater resistance to disclosure of the principles of calculation and determination of margins in transactions. A similar relationship exists with regard to the functional profile of related parties. It results from the fact that distributors with developed functions, being in the central division of the capital group, may oppose the imposition of pre-defined margins. (Jost i in., 2014) In such cases, the transfer pricing policy should refer to internal pricing procedures established by the subsidiaries. Furthermore, for the parent company, individual entities may act as centers of responsibility. This dependence is visible in vertically organized capital groups, where manufacturing entities act as contract manufacturers or toll manufacturers. In such a situation, the parent company acts as a unit setting and imposing prices in transactions. (Kabalski, 2001)

The scope of this policy should include a description of the course of the transaction from the moment of its planning to the stage of final development of transfer pricing tax documentation. An example of its scope of information on the basis of legal regulations in force in Poland is presented in table 1.



Table1. An exemplary scope of information included in the transfer pricing policy of the capital group.

Transfer pricing policy element	Entity obliged to establish principles of transfer pricing policy	The entity obliged to the application of transfer pricing policy principles	Comment
Transfer pricing policy objectives	Parent company	Parent company, affiliated entities	The objective is, among others, to verify on an ongoing and continuous basis the risk of questioning the validity of the established transfer pricing.
Legal regulations	Parent company	Affiliated entities	It is essential to continuously monitor and analyse changes in national legislation and OECD guidelines.
Capital structure of capital group	Parent company, affiliated entities	Parent company, affiliated entities	The recommendation is to create an organigram presenting the structure of the capital group.
Identification of value-added chains	Parent company, affiliated entities	Parent company, affiliated entities	In this respect, the key value-added chains that exist, i.e. those with a revenue of at least 5% of the group's revenue, should be indicated.
Characteristics and objectives of activities of entities in the group	Parent company, affiliated entities	Parent company, affiliated entities	Both the parent company and the affiliated entity should constantly provide information on the updated nature of the activities undertaken.
Principles of identification of affiliated entities	Parent company, affiliated entities	Parent company, affiliated entities	It is necessary to implement an order for each verification of the relationship between the participants in the transaction and to immediately provide information in this respect to the dedicated entity or other entities in the group.
Principles of identifying transactions in the capital group	Parent company, affiliated entities	Parent company, affiliated entities	A separate agreement should be drawn up for each transaction.
Principles of performing functional analysis of the transaction	Parent company, affiliated entities	Parent company, affiliated entities	Functional analysis is a synthesis of three analyses: analysis of functions performed, analysis of assets engaged and analysis of risks involved.
General principles of establishing transfer pricing in transactions	Parent company	Parent company, affiliated entities	Each time it is necessary to check whether the established price is consistent with market principles.
Principles of preparation benchmarking	Parent company	Parent company, affiliated entities	It should be determined how to obtain comparative data.
Creation of a schedule of activities related to reporting on transfer pricing	Parent company, affiliated entities	Parent company, affiliated entities	The deadlines for the preparation of documentation and tax declarations should be specified, along with the schedule for their submission to the tax administration.
Principles of intra-group communication	Parent company, affiliated entities	Parent company, affiliated entities	Rules should be established for providing the circulation of information needed to prepare transfer pricing tax documentation.

Source: Own elaboration based on:(Sulik-Górecka, 2018)



It is worth noting that the organizational effort made to prepare a coherent transfer pricing policy allows to achieve measurable effects in the form of an efficient transfer pricing system. Moreover, it should be stressed that due to the complexity and variability of the economic environment, it is not possible to cover all possible circumstances in the policy in question. Therefore it should be constantly assessed in terms of its validity and usefulness.

3. RISK AS PART OF TRANSFER PRICING POLICY

One of the key elements of the transfer pricing policy is the need to conduct a functional analysis, including the risks incurred by the parties to the transaction. This aspect should not be omitted by business entities, as it constitutes a component determining the amount of remuneration fixed by affiliated entities.

In the case of this element, the transfer pricing policy should include a detailed description of the risks taken by the parties to the transaction. The presented distribution of risk between the participants of the transaction should be as close as possible to the one between entities

on the independent market. In this respect, with reference to the BEPS Action Guidelines 8-10 proposed by the OECD countries, it is indicated that it is appropriate to reflect the supply chain course of the transactions and to allocate profit or loss to the entity that has incurred the risk. The emphasis is placed on the actual conduct of the transaction participants, and then the provisions of the agreement concluded between the parties are analysed. (OECD, 2017)

This is because, in the case of cross-border transactions, risk can be transferred by defining imaginary functions of entities. In this respect, the OECD guidelines indicate that a risk analysis will not be complete unless a comprehensive functional analysis of the transaction is carried out. Therefore, it is fundamental that the description of risk in the transfer pricing policy should include issues of how the risk is distributed among the participants of the transaction, their functions and the results of anticipated events that may potentially occur in connection with the execution of a given transaction. In this respect, the OECD guidelines propose to conduct a risk analysis in the so-called six steps. These are presented in table 2.

Table 2. Risk analysis of economic operations proposed by the OECD

	Description
Step 1	Identification of economically significant risks
Step 2	Analysis of the content of the agreement and indication of the risks transferred in the transaction
Step 3	Performing a functional analysis, determining the actual risk management and determining which of the entities controls the risk, accepts the beneficial and negative effects of its materialization.
Step 4	Interpretation of the obtained analysis results and their confrontation with the actual state determined by the actual behaviour of the entities and the financial capacity of the entities to incur a given risk.
Step 5	Allocation of risk to an entity which controls it and has sufficient financial capacity.
Step 6	Performing valuation of the transaction taking into account properly allocated risk and functions performed during its control.

Source: Own elaboration based on: (OECD, 2017)

The identification of risk and the response to it should be verified on a case-by-case basis. Sometimes assigning participants to the management function of a specific risk will not result in a thorough analysis, as some of them result from the nature of the transaction. In addition, when a specific risk occurs, both the negative and positive effects of its materialization should be considered. Sometimes, it is appropriate to apply a solution consisting in risk management and control by an external entity. In such a case, this entity decides to perform functions concerning its limitation and monitoring within the scope of the received order.

Transaction participants who incur its risk should also have appropriate experience and competence in this matter. In addition, it is closely related to obtaining the necessary information that will allow them to estimate the risk. It should be emphasized that risk control should not be reduced to the direct implementation of a specific action each time, as failure to respond to a given risk may constitute a fully conscious decision that allows for the creation of a favorable financial result.

Nevertheless, entities deciding to implement economic activities must bear in mind that events causing certain threats will be a critical element. As a consequence, the materialization of excessive risk may result in the failure



to achieve the objectives set. Therefore, it is important to verify the risks which have a significant impact on the financial condition of the entities, as it is they who may modify the business objectives set by the affiliated entities.

Moreover, in the scope of planned transactions, affiliated entities, when analyzing the content, should divide the risks into those arising directly from the agreement and those that can be predicted based on the interpreted facts specified in the agreement.(Cecchin i in., 2013) An example of a situation where the assumption of a specific risk is appropriate is when the participants of an agreement set payment dates depending on receiving remuneration of one of the participants from another entity in the supply chain. The risk assessment in this respect should be carried out ex ante.

It should also be borne in mind that the appropriate allocation of risk affects the pricing aspects of the agreement. The importance of this issue can be observed when an entity transfers the risk to the buyer as a result of fluctuations in raw material prices. In comparison with the case when an entity decides to bear the risk in its entirety, it should be considered that it may agree to make a lower profit.(Kosieradzki i in., 2019)

With these issues in mind, it should be considered that aspects verifying the risk incurred in a transaction should be included in the transfer pricing policy. These issues require a thorough rethinking by those who enter into transactions on an international scale and continuous monitoring of their relevance to the circumstances. Although risk is only one of many elements influencing the amount of the transaction price, omitting it may distort its correct estimation.

4. DETERMINING THE AMOUNT OF RISK INCURRED BY AFFILIATED ENTITIES - CASE STUDY.

As indicated above, carrying out a risk analysis should be a critical element of transfer pricing policy. For its proper allocation in a transaction, the so-called responsibility assignment matrix (also called the RACI matrix). (Jacka & Keller, 2009) This matrix is formed by an acronym indicating four aspects that should be taken into account in the analysis by economic operators:

- **Responsible** – responsible for performing a specific task,
- **Accountable** – supervising the correctness of project implementation,
- **Consulted** – counselling other entities participating in the project,
- **Informed** – having information about the execution of the project, but at the same time having no direct influence on the decisions made.

The RACI matrix is one of the proposals to determine the risk incurred by the parties to the transaction. Its applicability, purpose and design is presented on the example of entities A and B, which entered into an agreement to jointly develop a new product.

In the initial stage of the project, entities A and B established three main processes and matching sub-processes. Next, appropriate weights were assigned, thus illustrating the key activities for the success of the project.

Table 3. Weights of processes and sub-processes.

		Weights for process factors	40%	25%	35%	
Main process	Sub-process	Project management	Computerization	Supply logistics	Weights of subprocesses	
R&D activity	Development of the concept	10%	3%	1%	14%	
	Designing the prototype	5%	3%	0%	8%	
	Implementation support	10%	0%	0%	10%	
Production	Preparation of the machinery stock	5%	6%	5%	16%	
	Organisation of raw material supply	0%	3%	10%	13%	
	Component production	2%	3%	4%	9%	
	Prototype quality control	3%	1%	2%	6%	
After-sales service	Customer acquisition	0%	1%	6%	7%	
	Settlement of product distribution to customers	0%	3%	5%	8%	
	Product certification	5%	2%	2%	9%	
Summation		40%	25%	35%	100%	

Source: Own elaboration



The classification presented above allows to adjust the weight to a specific sub-process. In the next stage, the RACI matrix is constructed, whose intention is to relate

activities defined as a sub-process to entities A and B. For this example, the RACI weights are assigned according to the following digital designations, i.e. R-4, A-3, C-2, I-1.

Table 4. Assignment of weights for entities A and B.

Main process	Sub-process	R	A	C	I	Weight A	R	A	C	I	Weight B
R&D activity	Development of the concept	4	0	0	0	80%	0	0	0	1	20%
	Designing the prototype	4	0	0	0	67%	0	0	2	0	33%
	Implementation support	4	0	0	0	67%	0	0	2	0	33%
Production	Preparation of the machinery stock	0	0	2	0	33%	4	0	0	0	67%
	Organisation of raw material supply	0	0	2	0	33%	4	0	0	0	67%
	Component production	0	0	0	0	0%	4	0	0	0	100%
	Prototype quality control	0	0	0	1	20%	4	0	0	0	80%
After-sales service	Customer acquisition	4	0	0	0	57%	0	3	0	0	43%
	Settlement of product distribution to customers	4	0	0	0	57%	0	3	0	0	43%
	Product certification	4	0	0	0	57%	0	3	0	0	43%

Source: Own elaboration

Then, a comparison is made of the obtained RACI weights belonging to the sub-process weights of the obtained weights presented in the last column of table 4. The obtained results present the profit distribution reflecting

the functional analysis of the transaction chain by the participants of the transaction. It is worth noting that this is not a profit distribution defined as a transfer pricing calculation method.

Table 5. Determination of shares between entities A and B.

Main process	Weights for process factors		
	Sub-process	Share of entity A	Share of entity B
R&D activity	Development of the concept	11%	3%
	Designing the prototype	5%	3%
	Implementation support	7%	3%
Production	Preparation of the machinery stock	5%	11%
	Organisation of raw material supply	4%	9%
	Component production	0%	9%
	Prototype quality control	1%	5%
After-sales service	Customer acquisition	4%	3%
	Settlement of product distribution to customers	5%	3%
	Product certification	5%	4%
Summation		47%	53%

Source: Own elaboration



The above example shows the distribution of risk between the parties to the transaction. Therefore, the RACI matrix is one of the solutions that allows to present the way of its allocation. As far as the issue of the risk assessment is concerned, it should also be borne in mind that the party managing the risk may bear the highest costs of its materialization. In this respect, however, as a result of undertaking risk control, it should also be adequately remunerated for it. Moreover, it should be noted that the risk element is an essential aspect for the construction of an appropriate business strategy by related parties, as it determines the transaction price.

5. CONCLUSION

The proper management of intra-group transactions is an issue which all members of a given capital group should be responsible for. Any weakness in this respect results from a failure to ensure adequate accountability, strategy and transparency in the proper setting of intra-group transaction conditions. The growing interest of tax authorities in transfer pricing issues means that capital groups should demonstrate greater discipline, better internal control and accountability. Failure to comply with existing and emerging laws and regulations may pose a threat to the business activities of entities and increase the risk in the area of tax sanctions. Businesses should take into account existing risks related to non-market conditions of intra-group transactions. Entities that apply non-market prices or do not have proper tax records are exposed to the risk of upward adjustment of income from intra-group transactions. The above risks mean that in many companies, having a transfer pricing policy and procedures for managing intra-group transactions becomes a tool for the maximum reduction of tax risk, and also allows for consistent management of intra-group transactions. Therefore, the transfer pricing policy is becoming for entrepreneurs an increasingly important element in the process of determining the terms of intra-group transactions. One of the elements of the transfer pricing policy is the indication of the risk incurred by the parties to the transaction. Its incorrect definition may affect the overall results of the functional analysis, which cannot be ignored when calculating the transaction price.

6. ACKNOWLEDGMENT

This paper is part of the project No. 22010083 entitled "Experience sharing of Visegrad countries to tax avoid activity" financed by the International Visegrad Fund.

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FACTORS INFLUENCING THE TAX MENTALITY OF AN AVERAGE TAXPAYER IN POLAND

Dominika Florek

PhD student,
Wrocław University of
Economics and Business,
Wrocław, Poland

Abstract:

The main objective of the study was to evaluate the impact of specific elements of the tax environment upon the tax mentality of an average taxpaying natural person in Poland. For this purpose, the author identified four platforms for the analytical evaluation of tax compliance, namely: normative, organizational, economic, and psychological. The concept of tax mentality was defined, and followed by determination of factors that may potentially influence it. The study employed the following research methods: literature analyses and studies, statistical methods, thought experiment, diagnostic poll. The research problem was construed on the sound fundament of available sources and published research results, both domestic and foreign. The paper presents detailed analyses and conclusions derived from a pilot study designed and conducted by this author.

Keywords:

taxes, taxpayers, tax mentality, tax decisions, tax environment.

1. INTRODUCTION

A tax system is a constant element of daily human endeavours, globally. One cannot simply choose to abstain from paying their tax dues, as taxes represent an obligatory burden placed upon each and every taxpaying person. And since 'no one is patriotic about taxes', as aptly put by G. Orwell, the main objective of this study was to provide a careful analytical evaluation of factors that may influence the tax mentality of an average physical taxpaying person in Poland. Human behavioural patterns and habits may result in behaviours and attitudes which quite often defy logic or reason. In addition, taxpayers may choose to apply some of the legal methods of tax leniency vortex avoidance which are formally made available to them under the current legislation.

The main objective of this paper is to provide an evaluation of the impact exerted by factors representing the identified tax platforms upon tax mentality of an average taxpayer in Poland. The four tax platforms were identified on the basis of literature studies. This setting was then employed as a fundament for a pilot study intended to provide identifications of such factors of potential impact for each of thus defined categories of analysis. Replies from the respondent sample were then employed as basis for qualitative and quantitative analyses, together with examination of both the strength and direction of the identified correlations between factors. The subject of the study was defined to represent physical persons regulating their income tax obligations in Poland, while the object of research comprised of the current tax system in Poland, together with its internal and external environment, including the operation practices of those state institutions that directly affect the tax environment in Poland.

Correspondence:
Dominika Florek

e-mail:
florek.dominika22@gmail.com



The study employed a broad range of research methods, including literature analyses and studies, statistical methods, thought experiment, and diagnostic poll [Apanowicz, pp. 60-80]. The research problem was defined on the basis of literature studies in the sphere of tax management as well as analyses and studies of factors impacting tax decisions, both domestic and foreign. The author of the paper assumes that in tax awareness there may be a beginning of the beginning. Where man extends transience in one area to another, it will also expand. It seems obvious that the 4th Industrial Revolution will expect a higher level of awareness in every area.

2. TAX PLATFORMS AND TAXPAYER MENTALITY

Physical persons regulating their tax dues are naturally exposed (to a varied extent) to their national tax system and to some of its constituent elements. In an attempt at systematizing the wealth of notions associated with the tax environment, one may employ a classification by thematic area of their application. M. Poszwa postulates the following classification of tax aspects (referred to as platforms):

- normative;
- organizational;
- psychological;
- economic [Poszwa, 2008, pp. 15-17].

Subject literature provides examples of different terminology in use. For instance, P.M. Gaudemet utilizes a category of political area (in place of the psychological perspective) to integrate all the behavioural aspects of the studied problem [Gaudemet, 1990, p. 98]. Taking aside the above reservation, the normative platform represents the legal environment of a taxpaying physical person, including the national tax ordinance and all the detailed regulations applicable to specific forms of taxation. The organizational aspect is associated with the entirety of the state institutional taxation structure, including methods of operation available to state institutions as well as institutional personnel and their competences (both soft and hard). The psychological dimension is the most complex and compound group of aspects, influenced among other things by: taxpayers' subjective opinions, their emotions, historical or cultural determinants, and personal experiences with the tax system. Lastly, the economic platform comprises the entirety of the tax burden placed upon taxpayers, representing the ratio of cost to total assets held by them [Owsiak, 2017, pp. 253-259].

Decisions made by taxpayers are rooted in their pre-existing mentality. Tax mentality itself strongly affects the perception of the tax system as a whole. In its dictionary definition (Słownik Języka Polskiego), the term

'mentality' represents a mindset that defines a certain person or social group in clear opposition to others. Following this line of reasoning, it may be assumed that each person or group has their own distinct mentality [https://sjp.pl/mentalnos]. Tax mentality represents an attitude taken by a person or a group towards their tax obligations. In the above sense, tax mentality should be influenced by numerous factors of external character, such as the political climate, legal structure and judicial system, general education, culture, and emotional intelligence or general level of awareness. Mentality is also shaped by state governance and formal communication of tax redistribution patterns and changes in fiscal legislation by state institutions [Gomułowicz and Mączyński, 2016, pp. 274-278]. Lastly, tax mentality may also be strongly affected by ingrown personal attitudes and behaviours. Personal upbringing and early experiences may also shape the tax mentality of individuals at later stages in their lives.

The evolution (formation) of attitudes of individual persons towards their tax obligations is a complex process shaped by multiple factors. In view of the above, according to M. Pietrewicz, an average taxpayer may display some of the following six types of response to their tax obligations:

- tax compliance – full realization of one's tax obligations;
- tax shifting – transfer or redistribution of one's tax burden;
- seeking legal ways to evade tax obligations;
- price shifting to recover the cost of one's tax obligations;
- illegal evasion of one's tax obligations;
- withdrawal from economic operations burdened with tax.

Depending on the adopted model of response behaviour, taxpayers will adhere to their original decision and will be intent on full realization of their chosen strategy, as it best serves their primary purpose. Thus, satisfaction of taxpayers' internalized needs is a prime mover of their actions. Contrary to the classical economics, the volume of the expected economic benefits is not the only motive behind decisions made with regard to one's tax obligations. Taxpayers are also quite strongly influenced by factors of a decidedly more behavioural nature [Çiçek, 2019, pp. 223-244].

3. STUDY PRESENTATION AND RESEARCH METHODOLOGY

Pilot studies were the main instrument of choice for the realization of the study of relative strength of impact exerted by individual tax platforms and their constituents upon the tax mentality of respondent base. The base included 92 respondents – students of high education institutions in Poland.



The pilot study was designed to test the practical development of the postulated research problem. This form of a diagnostic poll can also be used for testing and evaluating the adequacy of the instrument selected for the task. Analyses of responses may be used to ascertain the need for further exploration of the subject under study [Nowak 2007, s. 59].

Respondents participating in the diagnostic poll were asked to present their opinions in a set of 32 queries, segmented into three categories. The first category was designed to form a statistical profile of the respondents, including age, place of birth, university, and field of study. The second category included queries of tax preferences, such as the preferred volume of tax obligations or their attitudes towards taxation in general. The last group of queries took the form of statements to be evaluated by respondents on a 5-degree scale, as follows:

- 1: strongly disagree;
- 2: partly disagree;
- 3: no opinion/I don't know;
- 4: partly agree;
- 5: fully agree.

In addition, statements in the last category were further separated into groups by tax platform they refer to. At the same time, statements were presented in a random sequence, to make sure that the respondents would be

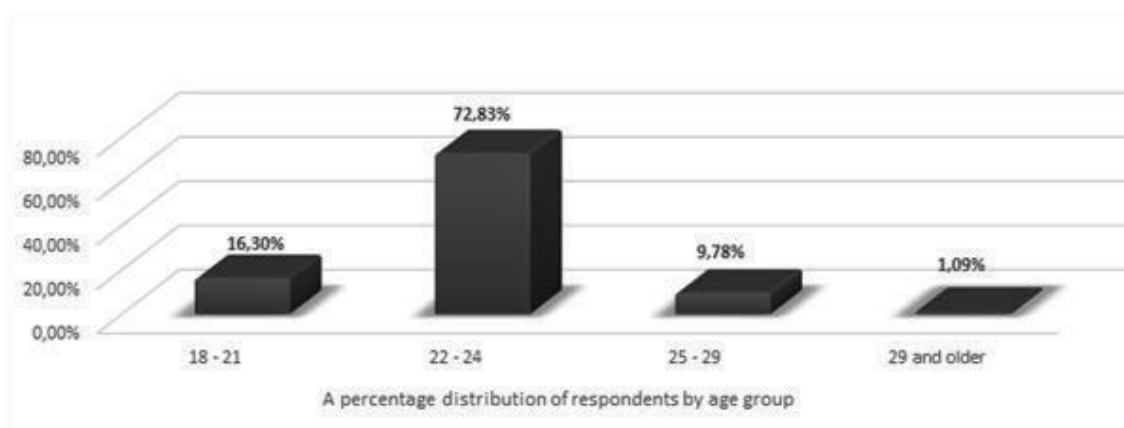
fairly unaware of the separation adopted for our purpose.

Responses to the pilot study poll were collected between March 10th and April 26th, 2020. The time frame coincided with the COVID-19 pandemic outburst. In effect, it may be assumed that the responses would be, to some extent, influenced by governmental strategies employed in response to the pandemic threat. At the time of the poll, the Polish government offered formal support for various tax and unemployment alleviation policies, such as a 3-month social insurance premium relief for entrepreneurs affected by the crisis or the surplus family allowance for persons forced to stay at home to take care of their children up to the age of 8 [The Act ... of March 2, 2020 r.].

4. DEMOGRAPHICS OF THE RESEARCH SAMPLE

The research sample established for the purpose of the pilot study included 92 respondents – students of high education institutions in Poland. The group was populated by 57.61% female and 42.39% male respondents. Of all the persons included in the study, 71.83% were between 22 and 24 years of age. Strong representation of 16.30% was recorded of persons in the age segment of 18 to 21. The least populated group was that of persons past the age of 29. Chart 1 presents percentage shares of all age groups included in the pilot study.

Chart 1. A percentage distribution of respondents by age group



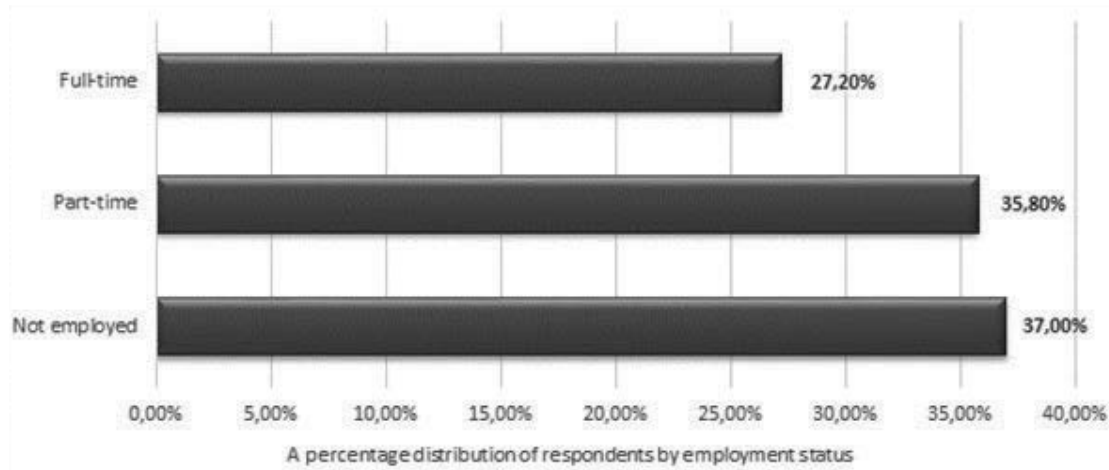
Source: own research based on responses collected in the pilot study

A strong share of 63.04% of respondents reported their status as 'combining work with studies', with 27.17% reporting their work obligations in a full-time employment regime.

In contrast to the above, 35.87% of all respondents described their status as students with part-time employment. Chart 2 presents the distribution of respondent sample by employment status.



Chart 2. A percentage distribution of respondents by employment status

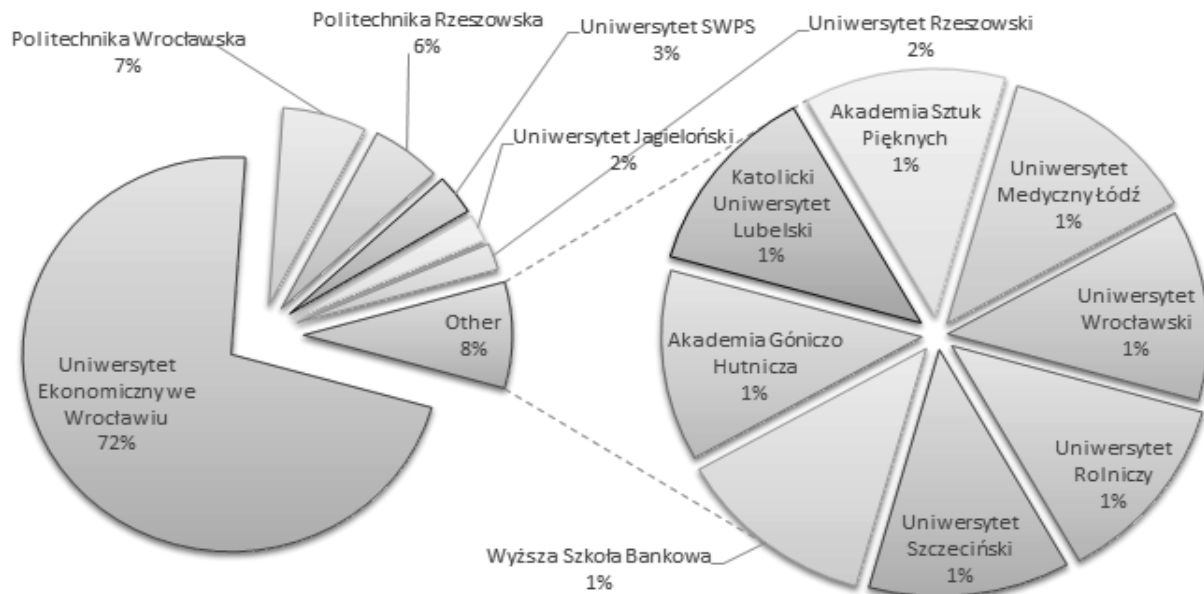


Source: own research based on responses collected in the pilot study

71.74% of all respondents defined themselves at the time of the poll as students of Wrocław University of Economics and Business. The second most populated group was that of students at Wrocław Technical University,

representing 6.52% of the respondent sample. In total, the poll was attended by students of 14 separate institutions of higher learning; see Chart 3 for details in this respect.

Chart 3. A percentage distribution of respondents by university



Source: own research based on responses collected in the pilot study

For reasons dictated by the precautionary measures introduced by the global COVID-19 pandemic, the pilot study was conducted using Google Forms, a free online survey service.

5. ANALYSIS AND EVALUATION OF THE POLL RESULTS

Analysis of responses to the pilot study poll were conducted with the use of descriptive and mathematic methods. Responses of all participants were presented in relation to the four identified platforms of tax environment,



in the form of percentage shares. Table 1 presents details of the adopted 5-scale evaluation collected in relation to statements representative of the normative platform. Of all the respondents, 72.83% were firmly (40.22%) or moderately adamant (32.22%) that *the Polish system supports an excessive number of taxation variants*. In addition, 85.87% of the respondents attached a ranking of five (36.96%) or four (48.91%) to the statement that *The Polish*

tax system places uneven burden on various social or vocational groups. Respondents in our diagnostic poll were partly (31.52%) or wholly opposed to the view (30.43%) that *The Polish tax system offers adequate protection of low-income persons*. Lastly, 80.43% of the respondents subscribed to the need for such solutions as tax reliefs, tax deductions and deductions from taxable income.

Table 1. A percentage distribution of poll responses associated with the normative platform

	I strongly disagree	I partly disagree	I don't know	I partly agree	I fully agree	Statement
Normative platform	2.17%	13.04%	11.96%	32.61%	40.22%	The Polish tax system support an excessive number of taxation variants.
	10.87%	19.57%	35.87%	28.26%	5.43%	The Polish tax system offers preferences for the financially excluded and for those in (transitory) financial distress.
	0.00%	5.43%	8.70%	48.91%	36.96%	The Polish tax system places uneven burden on various social or vocational groups.
	30.43%	31.52%	21.74%	13.04%	3.26%	The Polish tax system offers sdequate protection of low-income persons.
	4.35%	7.61%	7.61%	25.00%	55.43%	Tax reliefs, tax deductions, and deductions from taxable income are necessary.

Source: own research based on responses collected in the pilot study

The next platform subject to analytical evaluation was the psychological platform. Table 2 presents a percentage distribution of responses in this section. The statement that *The tax system in Poland is fair and just* was strongly opposed by 29.30% and partly opposed by further 42.39%

of respondents. As much as 88.04% were found to partly (28.26%) or strongly (59.78%) reject the statement that *The state is effective in managing their budgetary income from tax receipts*.

Table 2. A percentage distribution of poll responses associated with the psychological platform

	I strongly disagree	I partly disagree	I don't know	I partly agree	I fully agree	Statement
Psychological platform	29.35%	42.39%	17.39%	10.87%	0.00%	The tax system in Poland is fair and just.
	9.78%	6.52%	13.04%	33.70%	36.96%	The tax policy in Poland is a direct prodest of the curtent political agenda supported by the governing party.
	59.78%	28.26%	8.70%	2.17%	1.09%	The state is sffective in managing their budgetary income from tax receipts.
	17.39%	20.65%	19.57%	17.39%	25.00%	Given a choice in the matter, I would gladly abstain from paying my tax dues.
	39.13%	25.00%	18.48%	9.78%	7.61%	Withholding parts of formal inome for tax benefit purposes can be seen as a manifestation of resourcefulness.
	6.52%	16.30%	11.96%	29.35%	35.87%	Exploiting various gaps and loopholes in the tax law is a commenddable behaviour.

Source: own research based on responses collected in the pilot study



The next platform under consideration was the economic one. Table 3 presents a percentage distribution of responses in this segment. A total of 76.09% of the pilot study respondents subscribed to the view that *Taxes in Poland should be lower* (with full support from 56.52%ful-

ly, and partial support from 19.57%). The statement that *Tax dues paid by high-income persons are in fair proportion to their gains* was supported by 64.13% of respondents (43.48%and 20.65%, respectively).

Table 3. A percentage distribution of poll responses associated with the economic platform

Economic platform	I strongly disagree	I partly disagree	I don't know	I partly agree	I fully agree	Statement
	19.57%	19.57%	13.0%4	25.00%	22.83%	Tax dues should be calclued at a constant ratio, regardless of the reported income..
	9.78%	16.30%	9.78%	20.65%	43.48%	Tax dues paid by high-income persons are in fair propotriion to their gains.
	28.26%	18.48%	19.57%	23.91%	9.78%	Selected social and vocational groups should enjoy a range of tax privileges.
	3.26%	9.78%	10.87%	19.57%	56.52%	Taxes in Poland should be lower.

Source: own research based on responses collected in the pilot study

The organizational platform of our tax analysis included five statements, see Table 4 for a detailed structure of responses. A total of 79.35% of respondents recognized taxes as one of the major barriers to business entry in Poland (57.61% fully, and 21.74% partly). An interesting structure of responses was observed with relation to the following:

During my tax office visits, I typically have the satisfaction of being served by competent personnel. As much as 42.39% of respondents chose to select the 'I don't know' response, which may be evidence of their fairly limited experience in this context, with the majority of respondents still in their student years.

Table 4. A percentage distribution of poll responses associated with the organizational platform

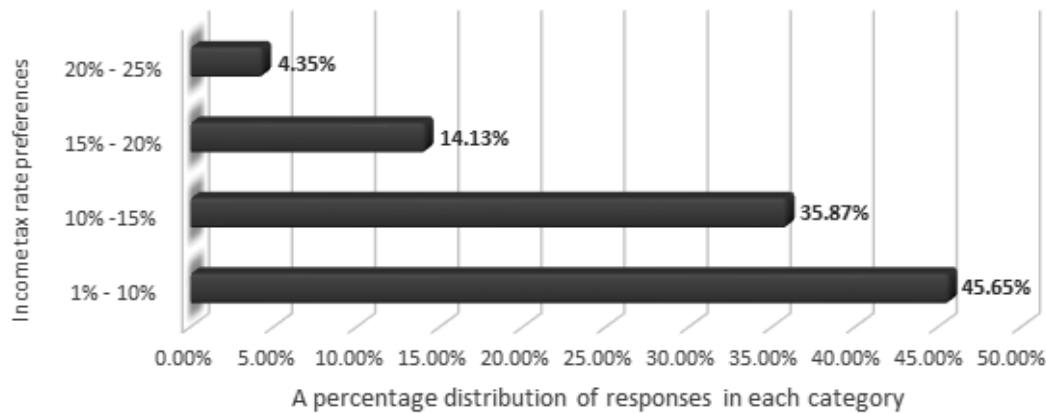
Organizational platform	I strongly disagree	I partly disagree	I don't know	I partly agree	I fully agree	Statement
	10.87%	21.74%	42.29%	16.30%	8.70%	Suring my tax office visits, I have the statifaction of being served by competent personnel.
	10.87%	29.35%	27.17%	26.09%	6.52%	Fiscal suthorities and institutions provide sufficient information and support for reporting purposes.
	11.96%	16.30%	34.78%	31.52%	5.43%	My experences with tax office perssonel have largely been positive.
	8.70%	5.43%	13.04%	34.78%	38.04%	I understand and recognize the state mechanisam of financing public services.
	0.00%	8.70%	11.96%	21.74%	57.61%	Taxes are one of the major barriers to business entry in Poland.

Source: own research based on responses collected in the pilot study

In one of the queries, respondents were asked for their preferences in effective income tax burden expected of them; for detailed distribution, see Chart 4 below. A sizeable 45.65% of respondents chose the 1-10% range of effective tax rate.



Chart 4. A percentage distribution of respondents by their disclosed tax rate preferences



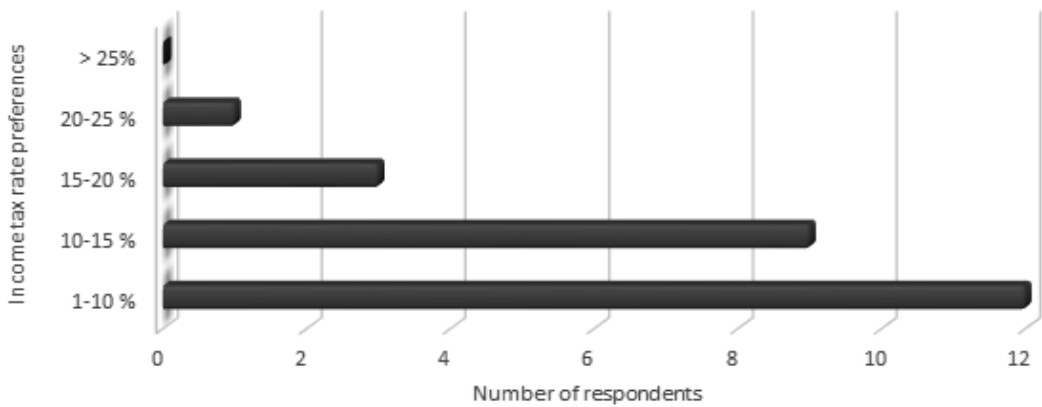
Source: own research based on responses collected in the pilot study

Our analytical evaluation included the examination of responses to the query of preferred tax rate in relation to the reported employment status (full employment, part-time employment, and no employment; see the relevant charts below for detailed distributions. As many as 12 of the respondents who report combining

their studies with full-time employment (48%) were found to subscribe to the view that their income tax should not exceed the 10% threshold.

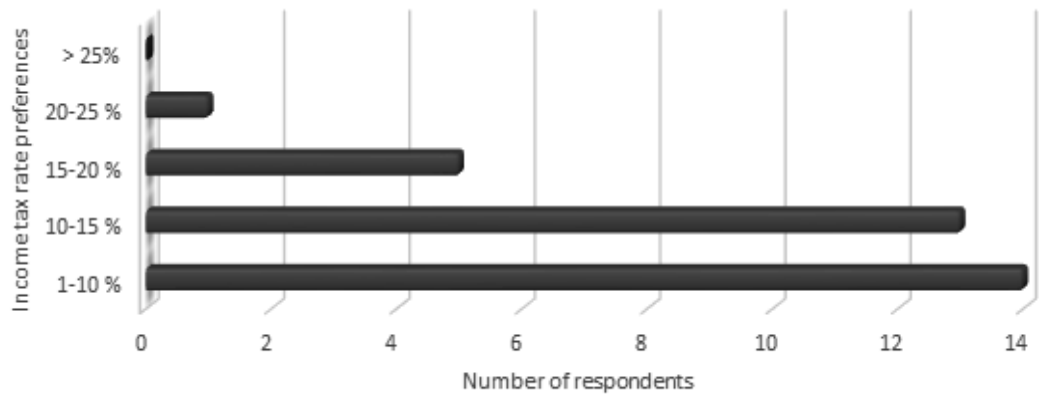
Chart 6 presents the preferred income tax rates among students with part-time employment. Again, a sound 42.42% showed preferences for the 1-10% threshold.

Chart 5. Tax rate preferences among students with full-time employment



Source: own research based on responses collected in the pilot study

Chart 6. Tax rate preferences among students with part-time employment



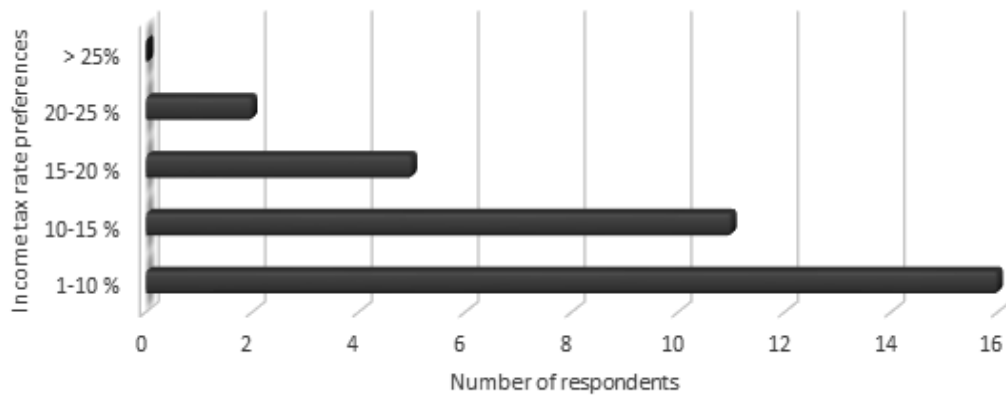
Source: own research based on responses collected in the pilot study



Lastly, Chart 7 presents the preferred income tax rates among non-employed students. Once more, a sound 47.06% of respondents in this segment chose the 1-10%

threshold as the most optimal sum they were willing to pass on to the public purse.

Chart 7. Tax rate preferences among students with no employment

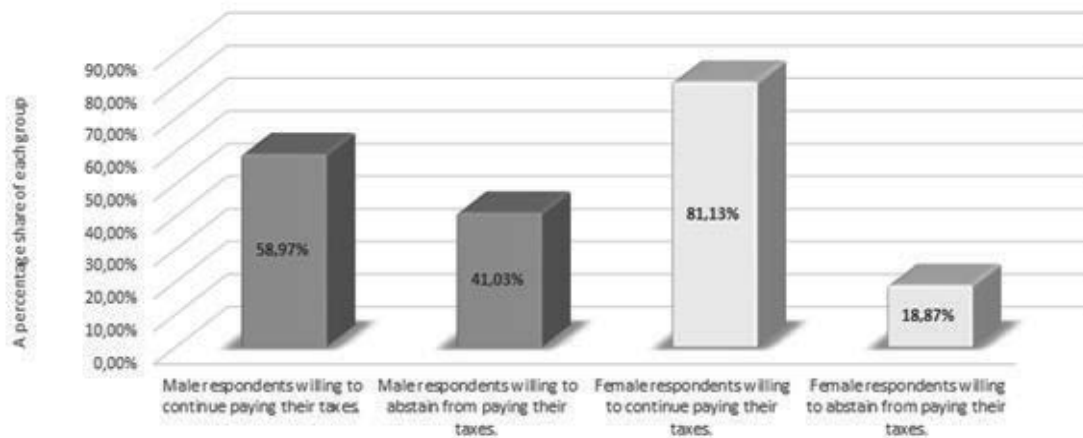


Source: own research based on responses collected in the pilot study

Analytical evaluation was also employed to examine the respondents' willingness to regulate their tax obligation from the gender perspective. For this purpose, the participants were asked to make their choice between upholding and abstaining from paying taxes if such a choice would ever be offered for their consideration. Chart 8

presents the structure of responses in this context: in such an imaginary scenario, 81.13% of women would be willing to keep paying their taxes; for men, the ratio was lower by a sound value of 22.43 percentage points, and amounted to 58.97%.

Chart 8. A percentage distribution of respondents by gender with regard to their disclosed willingness to pay taxes



Source: own research based on responses collected in the pilot study

Matrix 1 presents correlations observed between all the 32 variables identified over the course of the pilot study. Correlations in excess of 40% are marked in yellow, while green is used to signify elements described by correlations in excess of 50%. Correlations between variables were calculated using a standard Pearson function (Microsoft Excel).

Table 5 presents descriptions of the variables included in linear correlation analyses. Some of the variables required standardization to make them comparable with the remaining set.



Matrix 1. Linear correlations between the standardized variables

X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20	X21	X22	X23	X24	X25	X26	X27	X28	X29	X30	X31	X32	
X1	1																															
X2	0.4466	1																														
X3	-0.1367	-0.0906	1																													
X4	0.0891	0.1215	0.1002	1																												
X5	-0.4150	-0.1381	-0.0723	-0.1834	1																											
X6	-0.0522	-0.0623	0.0454	0.1845	-0.4150	1																										
X7	0.3006	0.2163	0.5365	0.0283	-0.4783	-0.4833	1																									
X8	-0.0121	0.1017	-0.4290	0.0318	0.0289	-0.0726	0.0450	1																								
X9	0.0255	-0.1317	0.0688	-0.0137	-0.0078	-0.0838	0.0589	-0.2545	1																							
X10	0.1275	0.1060	-0.2785	0.0693	0.0144	0.0785	-0.1061	0.3047	-0.0637	1																						
X11	-0.2655	-0.2335	0.1687	-0.0345	0.1215	0.0366	-0.1661	0.0176	0.0238	0.0995	1																					
X12	-0.0893	0.1037	-0.1705	0.1825	-0.1096	0.0639	0.0490	0.2004	-0.1658	0.1484	-0.0593	1																				
X13	-0.1112	-0.1867	0.1870	0.0995	-0.0642	-0.0108	0.0720	0.1239	0.0126	0.0640	0.1846	0.1589	1																			
X14	0.0506	0.0890	0.2838	0.1477	-0.0129	0.0109	0.0071	-0.1483	0.0633	-0.2309	-0.0585	-0.1967	-0.0130	1																		
X15	0.1177	0.0504	-0.2684	0.1487	0.0219	-0.0889	0.0580	0.2999	-0.1119	0.1862	0.0476	0.1860	0.2306	0.0577	1																	
X16	-0.1636	-0.0181	0.0714	-0.1021	0.1958	-0.0858	-0.0598	0.0373	-0.2009	0.0658	0.0073	-0.0278	0.0788	0.0523	-0.0394	1																
X17	0.0091	0.0794	-0.1486	0.0104	0.1965	-0.1842	0.0789	0.3357	-0.2140	0.1308	0.0472	0.1689	0.0484	-0.0327	0.3039	0.0440	1															
X18	0.0003	0.0875	-0.2000	-0.0220	-0.1314	-0.0501	0.1481	0.2381	-0.3265	0.1801	-0.1418	0.2195	0.1197	0.0007	0.1804	0.2427	0.3282	1														
X19	-0.1995	-0.1417	0.1291	0.0708	-0.0648	0.2628	-0.2150	-0.0293	-0.0290	0.2056	-0.0863	0.1826	0.3025	-0.0096	-0.1090	-0.0942	-0.0090	-0.1182	1													
X20	-0.0652	-0.1968	0.0984	0.0410	0.0470	0.1105	-0.1706	0.0369	0.1572	-0.0911	0.0478	-0.0284	0.2177	0.2706	0.0248	-0.0805	-0.1893	0.0048	0.0755	1												
X21	-0.2139	-0.1752	0.0243	-0.0744	0.0697	0.1825	-0.2400	0.0148	0.1058	-0.0580	0.0262	-0.0307	0.0895	0.1882	-0.0789	-0.0599	-0.1274	0.0478	0.1121	-0.7960	1											
X22	-0.0948	0.0002	-0.1378	0.0447	0.1339	-0.1938	0.0219	0.0906	-0.1210	0.1404	0.0994	0.0068	0.1245	0.1878	0.0278	0.0243	0.0827	0.1988	-0.1431	-0.0818	-0.0389	1										
X23	-0.0502	0.0867	-0.1018	0.2906	-0.0724	-0.0010	0.0864	0.1480	-0.1780	0.0448	0.0889	0.2870	0.1002	0.0717	-0.0081	-0.1627	0.0877	0.1711	0.0869	0.0430	0.0738	0.2264	1									
X24	-0.0734	-0.0845	0.2886	0.1383	-0.0875	0.1988	-0.0681	0.2888	0.0748	-0.2607	0.0103	-0.0993	0.1749	0.2182	-0.0201	0.1196	-0.0643	-0.0170	0.0063	0.1228	0.0980	0.0488	-0.0001	1								
X25	-0.1809	-0.1789	0.1452	0.0622	0.0824	0.0601	-0.1685	-0.2581	0.2285	-0.0716	0.1266	-0.2448	-0.0424	0.0670	-0.1284	0.1247	-0.0865	-0.1205	0.1965	0.2820	0.3726	-0.0543	-0.1064	0.1837	1							
X26	-0.0802	-0.0785	0.0811	-0.0730	0.0214	-0.1278	0.1105	-0.2501	0.0172	-0.1378	0.0016	-0.1321	-0.0403	0.0212	-0.0496	-0.0112	0.0516	-0.1072	0.1881	-0.0889	-0.0603	-0.2503	-0.1808	0.1008	0.2278	1						
X27	-0.2400	-0.2434	0.2138	-0.0278	0.0583	0.0911	-0.1805	-0.0818	-0.0938	0.1178	0.1906	0.1492	0.1896	-0.1854	0.1380	-0.1670	-0.0166	-0.1374	0.2107	-0.0129	0.0027	0.0415	-0.1049	-0.1474	0.0306	-0.0062	1					
X28	-0.0318	0.1017	-0.4290	0.0318	0.0289	-0.0726	0.0450	0.0289	-0.2545	0.2056	-0.0863	0.1826	0.3025	-0.0096	-0.1090	-0.0942	-0.0090	-0.1182	0.0007	0.1804	0.2427	0.3282	1									
X29	0.1239	-0.0214	-0.3005	0.1845	-0.0861	0.0950	0.0108	-0.0726	0.1385	-0.1945	-0.0913	-0.0774	0.0213	-0.0491	-0.1822	-0.1870	-0.0864	0.0806	-0.0397	0.0687	0.1103	-0.0474	0.0548	0.0734	0.0193	0.0070	0.0517	-0.8854	1			
X30	-0.1079	-0.0644	0.0363	-0.0732	0.0187	0.0187	-0.0431	-0.2204	0.1691	0.0278	0.0717	-0.0957	-0.1591	-0.0394	-0.1840	-0.2039	-0.3957	-0.2924	0.2189	0.0528	0.1880	-0.0771	-0.0129	0.0030	0.1897	0.1100	0.0005	-0.3780	-0.3007	1		
X31	-0.0347	-0.0085	0.0750	-0.1716	0.0575	-0.0483	-0.0119	-0.1384	0.0943	-0.2733	-0.0989	0.0002	0.0102	0.1700	0.0995	-0.3934	-0.1207	-0.0818	-0.1627	-0.1295	0.0594	-0.0663	-0.0682	-0.1009	-0.1481	-0.0991	-0.1984	-0.1894	-0.0875	1		
X32	0.0877	0.0905	0.2432	0.2645	-0.0198	0.1684	0.0078	-0.2603	0.2686	-0.2134	-0.0128	-0.2551	-0.2458	0.2887	0.1144	-0.1631	-0.1205	-0.3485	-0.1819	0.0872	-0.0785	-0.1009	-0.0811	0.2097	0.1487	0.1081	-0.1488	-0.2871	0.2177	0.1182	0.0184	1

Source: own research based on responses collected in the pilot study

Table 5. Descriptions of variables examined by linear correlation analyses, as shown in Matrix 1.

Variable	Description	Variable	Description
X1	Average monthly income over the last year.	X19	Opinion on the statement: The Polish tax system offers adequate protection of low-income persons.
X2	The value of personal income tax paid for the last reporting year (as reported in the PIT form).	X20	Opinion on the statement: My experiences with tax office personnel have largely been positive.
X3	Gender	X21	Opinion on the statement: During my tax office visits, I have the satisfaction of being served by competent personnel.
X4	Year of studies	X22	Opinion on the statement: Exploiting various gaps and loopholes in the tax law is a commendable behaviour.
X5	Vocational status: unemployed	X23	Opinion on the statement: I understand and recognize the state mechanism of financing public services.
X6	Vocational status: part-time employment	X24	Opinion on the statement: Selected social and vocational groups should enjoy a range of tax privileges.
X7	Vocational status: full-time employment	X25	Opinion on the statement: Fiscal authorities and institutions provide sufficient information and support for reporting purposes.
X8	Opinion on the statement: The Polish tax system supports an excessive number of taxation variants	X26	Opinion on the statement: The state is effective in managing their budgetary income from tax receipts.
X9	Opinion on the statement: The tax system in Poland is fair and just.	X27	Opinion on the statement: The tax policy in Poland is a direct product of the current political agenda supported by the governing party.
X10	Opinion on the statement: Tax dues should be calculated at a constant ratio, regardless of the reported income.	X28	Preferred value of personal income tax rate: 1% - 10%
X11	Opinion on the statement: The Polish tax system offers preferences for the financially excluded and for those in (transitory) financial distress.	X29	Preferred value of personal income tax rate: 10% - 15%
X12	Opinion on the statement: The Polish tax system places uneven burden on various social or vocational groups.	X30	Preferred value of personal income tax rate: 15% - 20%
X13	Opinion on the statement: Tax dues paid by high-income persons are in fair proportion to their gains.	X31	Preferred value of personal income tax rate: 20% - 25%
X14	Opinion on the statement: Tax credits and other tax and income deductions are needed.	X32	Response to the question: - If you ever had a choice between paying taxes and enjoying full benefits of public services or not paying taxes and resigning from the free use of public services (i.e. healthcare, education, police, armed forces, fire service, public roads, etc.), would you still be willing to pay your taxes? [YES/NO]
X15	Opinion on the statement: Taxes are one of the major barriers to business entry in Poland.		
X16	Opinion on the statement: Given a choice in the matter, I would gladly abstain from paying my tax dues.		
X17	Opinion on the statement: Taxes in Poland should be lower.		
X18	Opinion on the statement: Withholding parts of formal income for tax benefit purposes can be seen as a manifestation of resourcefulness.		

Source: own research based on responses collected in the pilot study



The highest correlation was found between variables X20 and X21, at 79.6%. It means that the more positive the experiences from contact with tax office personnel were, the more satisfied the respondents with the competence of tax office staff were. Responses to variables X11 and X19 are correlated at the level of 46.91%, meaning that participants willing to admit that the tax system in Poland places uneven burden on various groups were also more inclined to agree with the statement that the tax system in Poland offers adequate protection of low-income persons.

6. CONCLUSIONS

The study represents an attempt at evaluating the impact of various factors belonging to four main tax platforms (normative, organizational, psychological, and economic) upon tax mentality of individual taxpayers (physical persons) in Poland. For the purpose, the author employed a diagnostic tool in the form of an opinion poll. Based on responses collected during the pilot study, it may be assumed that tax mentality in Poland is subject to such impact, and evidenced in such aspects as: operation of state institutions, competences of tax office personnel, adjustment with current governmental policy, civic awareness level, and personal opinions of individual taxpayers. Each of the identified variables does exert a stronger or lesser impact on tax morality, providing grounds for further exploration. The evaluation of tax mentality in Poland was then related to the nature of the identified correlations – their strength and direction.

The findings produced by analytical evaluations will be employed as basis for advanced studies of the subject at hand. Further editions of the poll may be addressed to larger populations, to include respondents in a broader age spectrum and with different social or vocational background. Analyses of responses from such larger samples would require the use of more advanced instruments of data processing and analysis. Proper realization of the diagnostic poll on a larger scale would provide more informed input on the possible directions of further research.

7. ACKNOWLEDGMENT

This paper is part of the project No. 22010083 entitled “Experience sharing of Visegrad countries to tax avoid activity” financed by the International Visegrad Fund.

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TAX EVASION IN MONTENEGRO – THE FORMS OF MANIFESTATION AND MEASURES OF SUPPRESSION

Aleksandra Knežević

Student,
Singidunum University,
Belgrade, Serbia

Abstract:

When Montenegro became an independent state, the main goals were enabling tax policy to function in a way that would meet the standards of the European Union and enabling the state to become financially stable. The business strategies of the Tax Administration refer to zero tolerance rate towards the black economy and the application of a rigorous penal policy. A very important determinant of tax payment is tax morale - how much the taxpayer is willing to pay taxes voluntarily. The citizens of Montenegro are also involved in the fight against black economy through the application of "Be responsible, it depends on you. Black economy 0%", citizens report irregularities in the field of black economy. In the last five years, this project has shown very good results, a large number of fines have been imposed and half of the fines have been invested in projects of social importance.

Keywords:

tax evasion, black economy, taxpayer, crime.

1. INTRODUCTION

Tax evasion is a form of intentional complete or partial evasion of taxes, contributions and other duties, and giving false information about the acquired income in such a way that is criminally punishable. State authorities in Montenegro are often misled about the economic strength of taxpayers because in certain situations the taxpayer does not report income from performing a certain activity to the tax authorities. Tax evasion in Montenegro is manifested through avoiding taxes and contributions, evasion of profit tax, avoiding tax which is determined on the basis of tax returns, fraud with input and output VAT (value added tax) (Institut sertifikovanih računovođa Crne Gore, 2019).

Forms of tax evasion in the countries of the European Union and other countries in the region have great similarities with the forms of tax evasion in Montenegro. Although it is considered that the forms of tax evasion differ at first glance due to different tax legislation in Montenegro, the fact is that they have common features. A large number of countries like Montenegro are fighting tax evasion related to payments, i.e. payments of cash from offshore bank accounts and phantom companies.

Cases of tax evasion are detected and suppressed with the help of the following institutions: the Tax Administration, the Directorate for Inspection Affairs, the Special State Prosecutor's Office, the Police Administration, and the Agency for the Prevention of Corruption and other state institutions. In order to successfully implement the fight against tax evasion, it is necessary to coordinate administrative procedure, cooperation between the competent authorities, as well as the use of data at their disposal.

Correspondence:
Aleksandra Knežević

e-mail:
aleksandra.knezevic.16@singimail.rs



The Tax Administration performs the following tasks: controlling taxpayers with the help of inspection supervision, compiling reports on performed controls and issuing misdemeanour orders if necessary. The solutions established in the Information System of the Tax Administration, the database on taxpayers and the information obtained from other state bodies, play a significant role in the selection of taxpayers for inspection. The system of data exchange with foreign the Tax Administrations is being established. Due to highly developed Information System of the Tax Administration, tax authority can easily access the information of a taxpayer and thus check whether the taxpayer is settling stated obligations (contributions, VAT, profit). The most efficient procedure is the inspection of complete control of a certain taxpayer, according to which the tax authority can establish whether the taxpayer has accurately calculated and presented its obligations in the last five years, i.e. since the last inspection.

Montenegro implements various types of measures, the most important being the involvement of citizens in the fight against black economy. The campaign that began in 2014 and is called "Be responsible, it depends on you. Black economy 0%" is underway within the project "Involvement of citizens in the fight against black economy". This project is designed with the intention of providing more efficient and better communication between citizens and state institutions. A website and an Android application through which citizens can anonymously get involved in the fight against black economy have been created. Citizens anonymously point out to irregularities in the field of undeclared work, non-issuance of fiscal invoices, violation of consumer rights, etc. Due to significant participation of citizens in pointing out irregularities in the field of black economy and action of inspection bodies, after four months of the campaign "*Be responsible*", citizens pointed out over 1,200 irregularities in the field of informal economy, and inspection bodies imposed fines of over 400,000 euros. By the decision of the Government, half of the amount of fines imposed was directed to the financing of projects of general social importance, which are proposed and supported by the citizens themselves. The "*Be Responsible*" campaign is still active and citizens are significantly involved in the fight against the black economy (Poreska uprava, 2014).

2. LITERATURE REVIEW

In the group of criminal offenses against business operations as well as payment transactions, tax and fiscal criminal offenses are singled out in the Criminal Law of Montenegro. The main criminal offense from this group is the offense of tax and contribution evasion (Official Gazette of Montenegro, 2019).

Jovašević (2006) presented tax crimes, especially tax and contribution evasion, as the behaviour of individuals and groups, i.e. legal entities, which directly or indirectly endanger the financial interests of the community by violating regulations and therefore causing great damage to the fiscal system.

Milošević (2005) states that the payment of taxes objectively means the confiscation of a part of the income or property, which reduces the economic strength of the taxpayer and can lead to changes in his social position. It is natural for a taxpayer to think about how to minimize his financial obligation to the state.

Journal of the Institute of Certified Accountants of Montenegro (2018) states that tax evasion occurs as:

- Complete tax evasion relating to the case where the taxpayer avoids paying the tax liability in full, and
- Incomplete tax evasion means that the taxpayer partially avoids paying the appropriate obligation by concealing important facts

An important determinant of paying taxes is tax morale. It is considered that the willingness of taxpayers to pay taxes voluntarily leads to a lower probability of tax evasion. High level of tax morale means high quality of public goods and services, greater trust in the state and reduction of corruption (Arsić, Bisić & Randjelović, 2017).

The perpetrator of the criminal offense of tax and contribution evasion may be a taxpayer, legal representative or persons who file a tax return on his behalf and for his account; persons who compile final and periodic accounts of the company, keep business books and a person who only formally performs business activity on behalf of another person. According to Article 264 of the Criminal Law, Montenegro provides fines and legal penalties for any person who intends to avoid the following: taxes, contributions or other required duties in whole or partially; anyone who gives false information about: legally acquired income, objects or other facts that are of influence for determining such obligations. Prescribed imprisonment and fine depend on the amount of evaded obligation and payment, and can amount to a maximum of eight years in prison if the amount of the stated obligation exceeds 100,000 euros (Official Gazette of Montenegro, 2011).

In the fight for more successful implementation of tax discipline, various preventative and punitive measures are applied. Reducing the tax burden to a reasonable level also plays an important role in the prevention of illegal tax evasion, thus mitigating the factors that contribute to increasing the intensity of tax resistance (International tax avoidance and evasion, 1981).



Adopted in December 2019, the Decree on the manner and organization the state administration operations, made the the Tax Administration of Montenegro an independent body within the Ministry of Finance. The Business Strategy of the Tax Administration states that the primary direction of the Tax Administration is zero tolerance regarding black economy while respecting the principles of transparency, non-selectivity and application of rigorous penal policy, with the aim of reducing it to a level that will not endanger the healthy part of the economy (Poreska uprava, 2019).

In 2011, the Tax Administrations of Montenegro, Serbia, Slovenia, and Bosnia and Herzegovina signed a cooperation agreement in order to exchange data in a more productive way, prevent tax evasion and reduce black economy. The agreement ensures preventing black economy and tax evasion, which are problems of all countries in the region, as well as cooperation since no the Tax Administration can work on its own in times of globalization, when cooperation is needed at all levels.

In the scientific paper *“Towards changes in the tax system in Montenegro”*, the authors conclude that taxes and tax systems will be described as a set of complicated rules that often even legislators cannot clearly interpret in certain practical situations. All this leads to great confusion among taxpayers, increases costs for both the state and citizens, and in some ways justifies both of them to be inefficient in looking for culprits (Belgić, Subić & Ahmetović 2017).

The Ministry of Finance is planning to establish a Sector for Tax Police by the act on internal organization and systematization of the the Tax Administration, which will perform tasks related to: fighting against tax evasion, organized crime, fighting against black economy, coordination of activities with other authorities in order

to suppress money laundering, corrupt practices in the economy, tax crimes and economic crime. These plans are presented in the business strategy of the Tax Administration for the period from 2014 to 2019.

3. METHODOLOGY

Statistics on tax evasion in Montenegro are not available to the public. Therefore, a survey in which 105 citizens of Montenegro participated (invitation was sent on 125 e-mail addresses) was conducted in the first half of 2020. The survey was in the form of a Google questionnaire, through which Montenegrin citizens answered questions via the Internet.

A total of 105 respondents participated, 53 respondents were employed, 38 unemployed and 14 students.

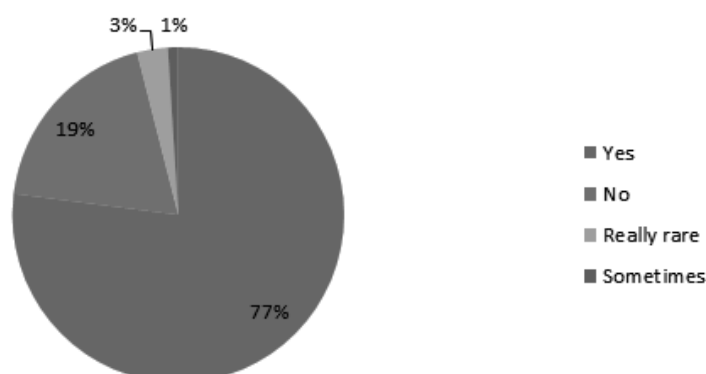
The survey consisted of five questions:

- Have you been in a situation not to receive an invoice when purchasing goods or services?
- Have you ever worked without being registered?
- Would you report to the authorities if you did not receive a fiscal invoice?
- Do you think that the penal measures implemented by Montenegro are effective in combating tax evasion?
- How would you rather report tax evasion (if you decided to take that step), through the “Be Responsible” website or through the Tax Administration Call Centre?

Research results are presented in the next chapter.

4. RESULTS AND DISCUSSION

Have you been in a situation not to receive an invoice when purchasing goods or services?



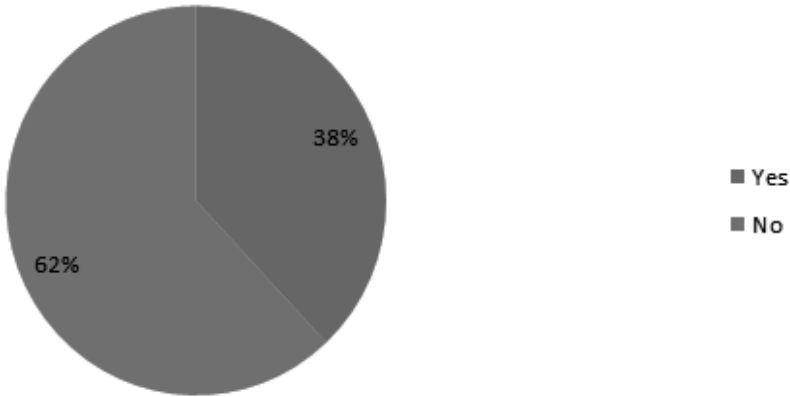
Graph 1. Have you been in a situation not to receive an invoice when purchasing goods or services?



Based on 105 respondents in the survey, 77% answered that they were in a situation where they did not receive a fiscal invoice when purchasing goods or services. This result is unsatisfactory because not issuing a fiscal invoice represents an illegal profit for the seller. The non-issuance of a fiscal invoice by taxpayers shows that their business

is illegal and means non-disclosure of turnover and tax evasion. Penalties in Montenegro for non-issuance of fiscal invoices range from 3,800 to 10,000 euros for a legal entity, and the minimum fine for an entrepreneur is 1,000 euros.

Have you ever worked without being registered?

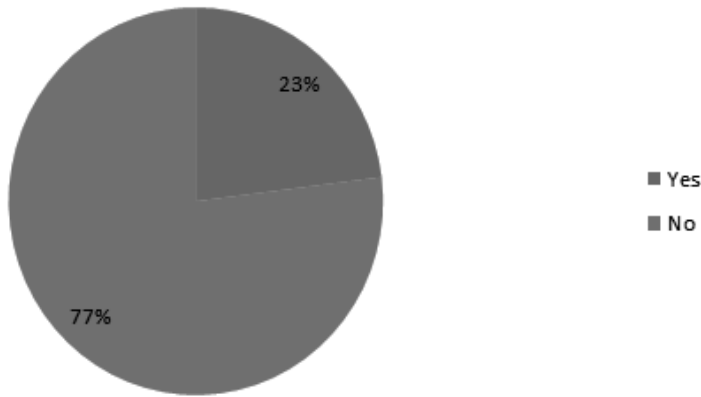


Graph 2. Have you ever worked without being registered?

In this graph it is shown that 62% of 105 respondents answered that they were not in a situation to work and not be registered. Although the situation is considered better than in previous years, that number is still high.

Undeclared work is most evident during the summer tourist season, when labour force arrives from countries in the region.

Would you report to the authorities if you did not receive a fiscal invoice?



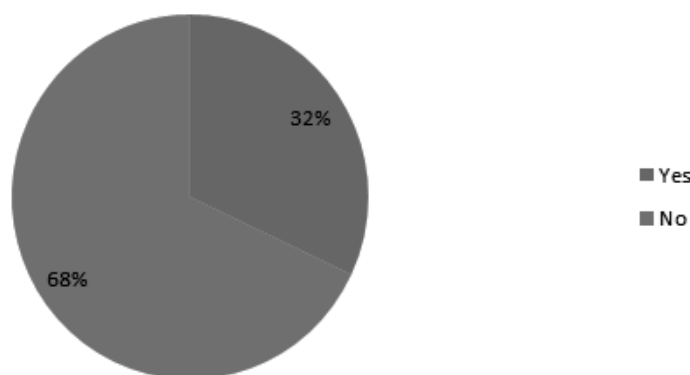
Graph 3. Would you report to the authorities if you did not receive a fiscal invoice?

It is necessary to inform citizens particularly about the importance of fiscal accounts. When a consumer takes a fiscal bill, it means that he thus protects his rights as a consumer (gets a guarantee of product quality and the right to a return claim). In addition, it contributes to state budget

increase and prevents money from going into the black zone. As many as 77% of respondents answered that they would not have reported to the competent authorities if they had not received a fiscal invoice.



Do you think that the penal measures implemented by Montenegro are effective in combating tax evasion?

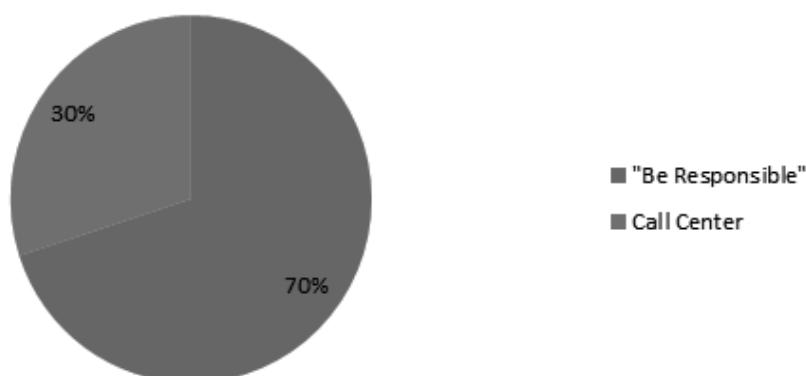


Graph 4. Do you think that the penal measures implemented by Montenegro are effective in combating tax evasion?

68% of respondents believe that punitive measures implemented by Montenegro are not effective in combating tax evasion. It is obvious that citizens do not trust in the tax system and penal policy in combating tax evasion. If we were to go back to the previous chart and see that 77%

of respondents would not report not receiving a fiscal bill, there is a clear correlation with this chart. Citizens doubt the penal policy and believe that the report will not improve the situation because the punitive measures are not effective enough.

How would you report tax evasion, through the call center of The Tax Administration or “Be Responsible” website?



Graph 5. How would you report tax evasion, through the call centre of the Tax Administration or “Be Responsible” website?

If a person decides to report tax evasion, it would be through “Be Responsible” website. The development of IS has enabled easier communication between citizens and competent authorities. 70% of respondents would rather opt for the “Be Responsible” site because they do not want to leave any trace but seek absolute anonymity. It is assumed that citizens often have prejudice that their identity will be revealed if they call the Call Centre of the Tax Administration.

Both ways are of great importance, and it does not matter which of these two will be chosen. What is important is that there is an awareness of citizens that they should do it.

Milić (2014) claims that the black economy in Montenegro is represented in all economic activities and says that the economic activity of the tourism and hospitality sector, due to insufficient economic structures, is a suitable area for income that is not recorded, and therefore not



subject to taxation. Problema of non-reporting accommodation capacities that are used for generating income during season, non-registering cash registers in catering facilities, non-issuance of invoices, non-registration of workers, non-payment of sojourn tax, etc. (special emphasis should be placed here).

5. CONCLUSION

Higher tax rates lead to a higher probability of tax evasion. It is rather natural for a taxpayer to think about minimizing the financial obligation towards the state through the activity he performs. Taxpayers are trying to increase their capital more easily and to keep most of their income by reducing the tax base on which their tax liability is calculated. There are large amounts of money and goods that move outside the taxation system in Montenegro, and the state authorities do not have the possibility to directly influence these flows.

In creating measures for more successful implementation of tax discipline, it is necessary to conduct research on the extent of tax evasion in Montenegro through various surveys of legal entities and entrepreneurs in order to illustrate this huge problem from the perspective of legal entities and entrepreneurs. Reducing the number and simplifying tax procedures would lead to a reduction in tax enforcement costs, as well as the introduction of the obligation to file tax returns electronically. In order to fight the problem of tax evasion more efficiently, the Tax Administration should pay attention to the training of employees in the Tax Administration, as well as by increasing the number of persons engaged in inspection supervision. The age structure of employees in the Tax Administration, especially tax inspectors, is a great challenge. The knowledge and skills of employees need to be transferred to new employees, for whom this will be the basis for more complicated business transactions. One of the most important preventative measures is to increase the awareness of citizens through the system of education and public information about the effects of tax evasion, because increasing tax discipline contributes to increasing the quality of services provided by the state. In order to improve financial discipline and combat tax evasion in Montenegro, it is necessary to effectively implement penal policy. Penal policy should be built so that fines are imposed in an amount that significantly exceeds the amounts of evaded tax liabilities. In order for the penal policy to be more effective, it is necessary to prohibit activity by the person who evaded taxes while performing that activity. In every country in the world, including Montenegro, a larger number of crimes in the field of tax evasion is committed than the statistics show, because a significant number of crimes remain undetected.

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PAPERS FROM THE THEMATIC AREAS OF THE CONFERENCE





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There are 20 papers related to the thematic areas of the conference, three of which are related to the projects supported by the Ministry of Science and Technological Development of the Republic of Serbia and COST CA 19130 - Fintech and Artificial Intelligence in Finance - Towards a Transparent Financial Industry. Authors' research interest were related to the Accounting (1), External Audit (1), Corporate Governance (3), Corporate Finance (1), Evaluation and Risk (1), Information Decision Support Systems (1), Banking (3), Marketing and Management (2), Human Resources (6) and Circular Economy (1).

Paper in the field of ACCOUNTING views fraudulent financial reporting as a global and permanent problem for corporate decision makers. The paper outlines various ways in which financial statements could be manipulated and suggests that the future research should address the issues of licensing the profession of a forensic accountant in the Republic of Serbia and strengthening the profession through quality training.

EXTERNAL AUDIT section features a paper that addresses the issue of automation in external audit. While the "Big Four" companies use expensive software, small and medium-sized audit companies use tools that they can develop or acquire, depending on their capabilities. The paper discusses the viability of small and medium companies using Excel to implement features present in General auditing software.

Three papers focus on the current trends in CORPORATE GOVERNANCE. The first paper examines the role of independent directors in corporate governance in IT companies in Serbia. The results showed a significant disconnection between the development of formal governance structures in IT companies and the observed attitude of the surveyed directors. The research also showed perceived lack of the need for a better governance structure in IT companies. The authors suggest that, in order to attract investments companies will have to have proper governance structures and demonstrate successful management of the agency problems. The second paper investigates the impact of COVID-19 pandemic on cyber-security in

Serbian companies and presents the results of online research conducted in the second quartile of 2020 by using Zoom Pulling Feature. The results showed that COVID-19 pandemic affected cyber-security of Serbian companies in terms of increased number of employees that had access to the corporate network from home, introduced risk management measures for mitigation of potential cyber-attacks and intensity of cyber-attacks on the company's system. The third paper is at the end of the Session and it represents *empirical data on financial and audit reports of Serbian business entities* - research work of PhD students at Singidunum University under supervision of respective professors. Research results, in the form of adequate data base, are available on the site of Mendeley. Young researchers and other interested parties can freely use database for their research, for more information please read the paper.

Paper in the field of CORPORATE FINANCE considers the potential use of Echo State Networks (ESN) for prediction of stock prices and provides the relevant arguments for such use. The paper suggests that ESN can be applied on Belgrade Stock Exchange, considering the intention of the Serbian government to stimulate issuing of bonds.

EVALUATION AND RISK section features a paper that investigates whether relationship between profitability and financial "health" of companies could be explained through implementation of Kralicek's DF model. The results showed that "HIP Petrohemija" company was the best performer in the sample. Further analysis using Beneish M-score and Altman Z-score unexpectedly revealed that its profitability is a direct consequence of government's intervention and conversion of company's debt into the equity.

Paper in the field of INFORMATION DECISION SUPPORT SYSTEMS defines the model for financial decision support based on fuzzy logic and applicable within banking sector. The paper aims to improve financial decision-making process in the banks by applying the concepts and models related to decision support systems, with the strong focus on decision-making support systems based on knowledge and intelligent decision support systems.



Three papers address the current issues in the field of BANKING. The aim of the first paper is to determine the impact of introducing innovations at the level of operational risk with a particular focus on the human factor and employment. The results for the period 2011-2019, including 26 banks, show that there was an increase in the capital requirements for operational risk and a downsize in the number of employees. The second paper analyses the characteristics, development factors and economic effects of the development of digital ways of communication between the bank and the client. The paper explains the mechanisms of business digitalization through explanations of the advantages and disadvantages of electronic banking, from the bank's point of view and from the client's point of view. The third paper analyses the European Money Quiz, as a digital learning initiative, as a direct response to the sustainable and resilient digital education for youth. The study shows how European Initiative in digital platform brings resilience to different concepts of organization of education for youth in Serbia and Greece.

There are two papers in the MARKETING AND MANAGENENT field. The first one aims to determine whether a presence on Google-owned platforms improves the website visibility on the search engine, expressed through the search engine optimisation (SEO) score. The study analysed the web presence of eight private universities in Serbia on Google My Business, Google Maps, YouTube and Google Images with software screening and observation of the search engine result page. The research results confirmed that Google favours its platforms, as universities with a symbiotic presence on all of them recorded the highest SEO score. The second paper emphasizes the relevance of social media for corporate businesses. It enables corporations to promote their business in a more efficient way, creating virtual communities that can help establish close connection with clients and to create a narrative that can bring benefit. Additionally, social media is an important factor in recruiting new employees.

Six papers address current issues in the field of HUMAN RESOURCES. The first paper provides an overview of leadership in traditional and virtual work contexts. In particular, the paper identifies transformational and transactional leadership styles as the two most impactful hierarchical leadership styles and outlines their outcomes in virtual teams. Additionally, the paper outlines the outcomes of shared leadership in virtual teams. The second paper perceives employee motivation as one of the crucial phases of the organizational change management process. It is argued that without successful motivation all activities of this process lose their meaning and cannot be successfully implemented.

The results of the study showed that motivating organizational members for organizational change is impossible without good organizational communication, good organizational culture, and good human resource management. The following paper emphasizes that HR automation enables organizations in general and Small & Medium Enterprises (SMEs) in particular to stay connected with market needs and enhance organizational effectiveness. The aim of the paper is to explore the scope of HR automation in SMEs by examining the benefits & challenges and illustrating the way forward for enhanced organizational effectiveness. The fourth paper focuses on the ethical implications concerning the effective change management in organizations, due to Corona-virus crisis focusing on the new ethical dilemmas that modern leadership must face suddenly. Through the philosophical view of ethics, the paper explores certain human behaviour – concerning leaders and employees - that has a strong impact on successful implementation of organizational change.

The subsequent paper argues that leaders in the modern business world more and more often rely on coaching skills to enable their employees to overcome challenges they face. The study showed that in most of the organizations from which the participants came there is no coaching support of employees. Furthermore, participants found that coaching education and coaching skills improved their leadership, communication and interpersonal relationships and contributed to their success. The main purpose of the sixth paper is to provide arguments as to why knowledge management is a driver of company's competitive advantage. The paper outlines that the company's financial performance is under the direct or indirect influence of invisible assets and resources posed by a particular company, that is, intellectual capital.

Paper in the CIRCULAR ECONOMY field discusses possibilities of using by-products in the circular production process in biogas power plants. The paper outlines numerous advantages of applying this concept such as the reduction of operating costs, reduced greenhouse gas emissions into the atmosphere, mitigation of climate change using renewable energy sources, etc.

It can be concluded that researches are motivated to be updated and investigate more under COVID-19 influence on all segments of scientific, business and social life.



FRAUDULENT FINANCIAL REPORTING AS A PERMANENT PROBLEM FOR DECISION MAKERS

Milorad Kovjanić,

PhD candidate,
Singidunum University,
Belgrade, Serbia

Abstract:

Manipulation of financial statements is a type of accounting fraud that is a permanent problem of companies observed at the global level. Losses due to fraud and manipulation of financial statements are huge and amount to more than 3.6 US dollars. This fact indicates the need for constant research on the types and methods of performing fraudulent activities as well as their causes, which is the topic of this paper. Therefore, the presented paper explores in a general sense the types and ways of fraudulent financial reporting, which is certainly a permanent problem of decision-makers. Certain directions for future research on the complex issue of fraudulent financial reporting have been identified.

Keywords:

financial statements, fraudulent actions, earnings management, decision making.

1. INTRODUCTION

Financial statements are important in meeting the function of accountability, and can be presented as a type of records that conveys the results of operating activities, i.e. financial performance of economic entities, and include a key, balance sheet, income statement and cash flow statement. Based on the information presented in these statements, various stakeholders make business decisions. In this regard, it is of particular importance that the financial information is valid. Among many other authors, Kedia and Philippon (2009) emphasize the importance of examining fraudulent/false financial reporting, given that the economic and social consequences of these events can be enormous. "Fraudulent financial reporting is nothing new, it is a phenomenon known for a long time in accounting practice" (Milojević et al., 2020, p. 262). Numerous non-financial frauds from the past have led to the loss of confidence of users of financial information in their credibility, and thus, necessarily, in increased caution in their use. Well-known world financial scandals point to this fact. As Mitrić et al. (2019, p. 43) points out, "the financial reporting system and the accounting and auditing profession have often been accused of fraud and loss of confidence in the reliability of financial information by numerous users and economic decision-makers". One of the common examples from the practice of manipulation is earnings management. The essence of this manipulation is to direct the profit in the direction of the desired outcome. Therefore, this example, as a representative example of manipulation, is specifically described in the paper. Defining fraudulent activities is a constant task of fraud researchers, given that the conditions in which business activities take place are constantly changing, and it is necessary to constantly upgrade these definitions. The paper provides an overview of several relevant definitions and perceptions of the concept of fraud.

Correspondence:
Milorad Kovjanić

e-mail:
kovjanicmilorad64@gmail.com



Fraud detection is not in the focus of external auditors, which is why the forensic option of auditing and accounting was created. The goal of forensic accounting and auditing is precisely to detect fraud with the aim of bringing the perpetrators of fraud to court on the basis of collected and court-accepted manner of collected and presented evidence. In addition to this goal, the preventive actions of these specific types of accountants and auditors with the aim of preventing fraud are on the same level. The result of such actions is the discovery of major world financial scandals, which is specially treated in the paper.

2. DEFINITION OF FRAUDULENT ACTIONS AND EARNING MANAGEMENT

Fraud is an action that is carried out with the intention of providing the perpetrator with an illegal benefit, and can occur in various areas (finance, investments, insurance, real estate), in different shapes and forms. Fraud is a complex concept, so different approaches to defining this concept stand out in the literature. It can be stated that fraud involves making a profit with the help of unauthorized actions, procedures and tricks, often include theft of resources, information and use of the property without approval. In principle, two views stand out, namely that manipulations are frauds if they contain certain elements that characterize frauds, but also that all manipulations are not illegal. Gulin (2002) points out that, although the term "manipulation" causes negative connotations associated with illegal activities, not all manipulations are, as a rule, illegal. In most cases, manipulations relate to activities and the effects of those activities that are within the law, as opposed to fraud in financial statements that explicitly include activities that are outside the legal norms (Gabić and Miljko, 2018). In order for fraud to be seen in its entirety, it is necessary to start from the factors that influence its appearance. In this context, it is pointed out that the occurrence of fraud is influenced by external factors, such as economic, competitive, social, political, and internal factors, such as lack of controls or ineffective controls, lack of ethical standards, lack of positive business results, or profits, lack of trust, etc., and it is, therefore, necessary to perform a continuous risk assessment in order to establish a reliable sustainable fraud management system (Cvetković and Banović, 2019).

Manipulation of financial statements is a type of accounting fraud that is a permanent problem of companies observed globally. The losses due to the manipulation of financial reports are enormous. According to the ACFE (Association of Certified Fraud Examiners), these losses amount to more than 3.6 billion US dollars. Fraud is outside the Generally Accepted Accounting Principles (GAAP), while earnings management is within GAAP

(Erickson, Hanlon, & Maidev, 2006), as underlined by Perols & Lougee (2010). The situation is identical in the case of IFRS - International Financial Reporting Standards and International Accounting Standards - IAS. Earnings manipulation is one of the most common examples of manipulation and can be defined in different ways. Healy & Wahlen (1999, p. 368) state that "Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers". Companies can manipulate financial statements in a variety of ways, and one that stands out "in particular" is earnings management by applying discretionary accruals or by committing fraud itself. Giorux (2003) defined earnings management as the use of operational and discretionary accounting methods to adjust earnings to the desired outcome. Ronen & Varda (2008), point out that earnings management is actually intentionally changing financial information in order to give users of that information a wrong picture of the economic position of the company. Earnings management as a manipulation ultimately aims to mislead users of financial statements to the desired conclusion.

3. THE ROLE OF AUDITORS AND FORENSIC ACCOUNTANTS IN FRAUD DETECTION AND MANAGERIAL RESPONSIBILITY

It is a known fact that in an external audit, the auditor is required to determine that the financial statements do not contain materially inaccurate statements. The external auditor is not expected to detect fraud, but to determine the accuracy and truthfulness of positions in the financial statements. The task of the internal auditor is to determine fraud and manipulation, and the focus of the forensic auditor or accountant is to detect and prove fraud. However, although auditors are usually required to detect fraud in financial statements only if they have resulted in material misstatements (it can be formulated in this way), there are situations in which the auditor cannot be expected to identify fraud and situations in which the auditor should have identified fraud (Killen, 2016). Namely, in accordance with ISA 240, auditors are liable for fraud only if they have led to material misstatements (which he has disclosed or which he has not disclosed). Otherwise, the auditor is not liable for fraud that has occurred because it does not affect financial reporting.

In that sense, the possibility of performing two types of audits, auditing financial statements and auditing fraudulent activities, is emphasized. The audit of the financial statements alone does not reveal fraud. It is necessary to audit fraudulent activities.



It is well known that generally speaking, there is no company that is immune to the risk of unethical behaviour or fraudulent activities, so the emphasis is on improving investor confidence and public confidence in financial statements. In this context, Petković et al. (2020) point out that there is often the question of where the line between legitimate and fraudulent earnings management is. The disclosed financial scandals have led to forensic accounting becoming an attractive opportunity for accountants in the fight against fraud. "Forensic accounting includes both litigation support and investigative accounting" (Milojević et al., 2020, p. 258). The world of forensic accounting has been evolving for the last 70 years. As already mentioned, some attribute the understanding of fraud as a subject of scientific study to the authors Edwin & Cressey (1934), who published a paper entitled "Principles of Criminology", in which they defined and described the fraud triangle, which was later included in the Statements of Auditing Standards - SAS 99, Consideration of fraud in the audit of financial statements, which refers to the elements of the "triangle fraud". The fraud triangle framework, as one of the first models conceived on the basis of conducted empirical research, has been used to explain financial crime since the 1940s (Homer, 2019). As it turns out in theory, financial crime and fraud in the workplace only happen when the offender has enough opportunities, pressure and rationalization to commit a crime. As emphasized by Vukadinović, P. and Obradović, M. (2018), theoretical and empirical research has unequivocally shown the need to modify this model.

The task of a forensic auditor or forensic accountant is precisely to prove and detect fraud. Forensic accounting depends on different pillars. These pillars include the character of an accountant, the necessary experience and tools, and knowledge of the law (Hadman, 2018). In addition to activities to identify fraudulent activities, forensic accountants also work on their prevention. Various organizations and institutions, including, for example, the United Nations, as well as the World Bank, are increasingly directing their financial resources towards activities to strengthen the capacity of fraud investigators, on the one hand, and to raise awareness of the dangers posed by fraud to developing economies, on the other hand.

Management in organizations has a particularly important role in the fight against fraud. Fraud with financial reports does not take place in a vacuum, but it is made possible by the absence of an ethical culture (Mintz & Morris, 2017). According to the same authors, the culture often created and a tone established at the top represent the image of a company willing to do whatever it takes to create a rosy image of financial results. Precisely because of this, one of the more important issues to consider is raising the awareness of management in the process of understanding the risk of fraud and the steps taken to mitigate the risk.

As stated by (Knežević et al., 2019), if we keep in mind that the company's management is responsible for the efficient operation of the company, preparation of financial statements, as well as for the functioning of internal control systems, it is logical to conclude that it has a dominant position in the company structure. As such (the management) possesses a unique ability to commit or approve fraud. This role of management is based on the position to directly or indirectly manipulate accounting records and present false information. For this reason, the auditor needs to pay special attention to management behaviour and performance in the business. In that sense, the great importance of internal control systems is pointed out as a proactive mechanism in preventing fraud in the financial and accounting segment, as well as in detecting warning signs, in order to reduce the inefficient use of company funds to the lowest possible level.

4. SPECIFIC EXAMPLES OF FRAUD OCCURRENCE IN FINANCIAL STATEMENTS AND TOOLS FOR THEIR DETECTION

The Association of Certified Fraud Examiners - ACFE is the world's largest anti-fraud organization and the leading organization for education and certification of anti-fraud training. In addition to strict accounting controls in the form of two dominant groups of accounting standards such as IFRS (International Financial Reporting Standards) and GAAP (Generally Accepted Accounting Principles), ACFE practice in the past has proved not so small number of abuses of "creative flexibility" and well-known financial scandals like Enron, Xerox or WorldCom in the United States, Toshiba in Japan or the Parmalat scandal in Italy, as well as the Agrokor case which is more famous regional scandal to us because it is in our neighbourhood, and this is exactly what they are proving.

In order to effectively manage the risk of fraud, it is necessary to know the techniques and ways of "styling" financial statements. All users of financial statements are interested in this information, both internal and external; banks, investors, business partners, financial institutions, control/inspection bodies, criminal inspectors, tax inspectors, internal and external auditors, controllers, etc.). The motive for the interest of these users of financial statements and especially control bodies is that such procedures are identified/recognized in the financial statements, with the aim of preventing and combating accounting manipulations (Cvetković and Bošković, 2018). In the relevant academic and professional literature, different approaches can be found in solving the problem of identifying fraudulent actions in financial statements, as well as different criteria for their division. One of the classifications of methods for detecting fraud in accordance



with ACFE recommendations (Maedia, 2010), includes (1) horizontal and vertical analysis of financial statements, (2) analysis of financial indicators (ratio analysis), and especially trends in recent years, (3) application of the Beneish M-score test in identifying profit manipulations, (4), examination of statements according to Generally Accepted Accounting principles versus statements for tax purposes, as well as additional in the form of (5) irrational price/earnings: the benchmark is from 20 to 25, and the average of the S&P agency is approximately 36, (6) Application of SAS standard no. 99 by financial auditors and (7) other techniques. In addition to the above, it is important to keep in mind the application of Benford's law, i.e. Benford's distribution, which is often used in forensic proceedings and in some cases as the first step in the analysis of manipulations in financial statements. The Chartered Institute of Management Accountants (CIMA, 2008) suggested day-to-day techniques available to help identify irregularities that may be a fraud and investigate anomalies to decide whether further action should be taken: (a), reading history (publications - books and journals in the field of fraud and financial irregularities), (b) risk assessment of fraud, (c) benchmarking, (d) system analysis, (e) ratio analysis, (f) database modelling data, (g) specialized software, and (h) exception reporting.

In recent decades, a large number of corporate financial scandals have shaken many countries. One of those countries that have been affected to a large extent is the United States. Arthur Andersen - an auditing company (from the former "Big 5") did an external audit for both companies, which will be explained below. One example of this is the following case study. In a relatively short period of 15 years, Enron has risen from nothing to become the seventeenth-largest company in the United States and the most famous energy supplier in the world. However, during 2001-2002 it turned out to be one of the biggest corporate financial frauds. It was later determined that the company's financial statements were fraudulent i.e. false, as well as the fact that huge debts were hidden so that they were not visible on the company's accounts. One of the schemes they used was "inappropriate treatment of revenue". Namely, the chief financial officer of the company admitted in his presentation in court that most of the sales revenue was booked before the actual realization (Healy & Palepu, 2003). During 1998, Enron increased its revenue from \$ 20 billion to \$ 31 billion, by the end of 1999 the increase in revenue went up to \$ 40 billion, and by the end of 2000 as much as \$ 100 billion, from which it can be concluded that there is a 390% increase in revenue over four years. One of the main reasons for the collapse of the Enron company is that the Securities and Exchange Commission allowed this company to use the market to market accounting method. Enron reported \$ 1.4 billion in pre-tax profit in 2002, then derivatives were manipulated,

and the new report showed an increase from \$ 1.8 billion to \$ 10.5 billion, and the 2000 financial statements show over \$ 16 billion in profit on the basis of the derivative. (Li, 2010). As if the scandal with the company Enron was not enough to damage the identity of corporate America, another big financial scandal occurred, which seriously shook America. It is about the company WorldCom, which at that time was a telecommunications company that was one of the most influential in the world. However, the investigation conducted by the US Stock Market and Securities and Exchange Commission (SEC) in 2002 showed that the managers of that corporation increased the value of the company by as much as 11 billion dollars through various fraudulent actions. At the time of bankruptcy, WorldCom had a debt of about \$ 32 billion, and the value of its assets was at the level of \$ 107 billion (Jeter, 2003). This company presented all its expenses as CAPEX (capital expenditures, i.e. investments), which resulted in an unjustified increase in profits.

5. CONCLUSION

Research related to determining the quality of financial statements is always current and interesting, both to the scientific and professional public. Financial statements are used to make a number of economic decisions of interested recipients, and therefore it is of particular importance that the information they contain is valid for business decision-making, both at the strategic and operational levels. Today, the profession of a forensic accountant is a fully formed profession that has developed as the business world has changed and progressed, both in the country and abroad. Forensic accounting is crucial and it is very important to help mitigate fraudulent actions in financial statements, and especially in exposing manipulations in earnings management. Further directions of research could go in the direction of raising the issue of licensing the profession of a forensic accountant in the Republic of Serbia, and the necessary measures to strengthen this profession through quality training. It also concludes that strong academic support would be needed to encourage the development of forensic accounting within the national framework. There is a significant number of tools that can be used to detect fraud. Some of them are Beneish's model, ratio analysis, Benford's law and other. A well-organized system of internal control and internal audit in companies plays a major role in the adequate management of the risks of fraud.



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MONETARY UNIT SAMPLING USING MSEXCEL – AUTOMATION IN EXTERNAL AUDITING

Mihailo A. Todorović^{1,2*},
Miroslav Ž. Perić²

¹PhD candidate,
Singidunum University,
Belgrade, Serbia

²Singidunum University,
Belgrade, Serbia

Abstract:

In the preparatory phase of auditing the client, a proper assessment of materiality is necessary, since it determines the scope of population testing. Furthermore, determining the proper model and the type of population sampling ensures that the real business of the entity will be shown in the financial statements. Depending on their size, audit companies use different tools in their work. The largest audit companies ("Big Four") use expensive software, while small and medium-sized audit companies use tools that they can develop or acquire, depending on their capabilities. In this paper, we discuss the viability of small and medium companies using Excel to implement features present in General auditing software. Two processes – stratification and monetary unit sampling are provided as examples.

Keywords:

external audit, CAATT, MSeExcel, Monetary-Unit Sampling, stratification.

1. INTRODUCTION

Auditors rely on a variety of computer assisted auditing tools and techniques (CAATT), whose purpose is to increase the processing speed, reduce errors and improve operating efficiency (Lin C.-W., Wang C.-H. 2011.). The software and tools, which CAATT comprise of, can be further categorized into two groups:

1. General auditing software (GAS) such as Audit command language (ACL), or Caseware's Interactive data extraction and analysis (IDEA). These tools are considered to be professional and offer a wide range of utility.
2. Complementary software such as Excel or Access. These tools are more commonly used as they are less complex to implement in comparison to GAS, which is why they are preferred in smaller and medium sized auditing companies.

The choice between which tools to use is entirely up to the company and their available resources, as the International standards on auditing (ISA) do not officially proclaim a specific software for auditing purposes. While larger auditing companies and the „Big Four“ have resources to either develop their own tools internally or purchase a custom made software which caters to their specific needs (adapted to the audit firm's group methodology and used by the whole group anywhere in the world), small and medium sized companies are left with a choice between investing into GAS and using complementary software to compensate for certain tasks when necessary, or exclusively using complementary software for auditing.

A study in the United Kingdom found that a majority of small and medium sized external auditing companies in the UK made no use of GAS at all, stating that they found high implementation costs, significant learning curves and

Correspondence:
Mihailo A. Todorović

e-mail:
mtodorovic@singidunum.ac.rs



adoption processes off-putting, instead voicing their preference of traditional manual auditing methods. (Ahmi A., Kent S. 2012.)

In this paper we investigate whether an auditor can create a tool using complementary software that can offer a similar level of automation that GAS offers. As an example, we provide a tool for stratification and assistance in selection when using monetary unit sampling made in MSEXcel using Visual Basic for Applications (VBA).

2. LITERATURE REVIEW

In a research paper written by Ching-Wen Lin and Chih-Hung Wang (2011), different types of CAATs are discussed and main decision-making factors that need to be considered when assessing auditing software are listed. Lin and Wang use a focus group interview and analytic network process (ANP) to develop their model for assessment of auditing software. The authors use Audit Command Language (ACL), Interactive data extraction and analysis (IDEA) and Focaudit as the assessment examples and note the differences between user experiences with them.

Aidi Ahmi and Simon Kent (2012) discuss the lack of utilization of generalized audit software by external auditors in the United Kingdom. Ahmi and Kent used a web-based survey to gather the perceptions of 205 statutory auditors in the UK. The authors stated that 73% of external auditors made no use of GAS, and discovered which particular factors influence the likelihood of auditors using GAS, as opposed to the traditional auditing methods.

The International Auditing and Assurance Standards Board (IAASB), which sets high-quality international standards for auditing, assurance and quality control, provides the standard for sampling in auditing – ISA 530. ISA 530 describes the process of sampling and the principal sample selection methods.

An online article for the CPA Journal written by Bruce Wampler and Michelle McEacharn (2005) proposes an automated solution for Monetary-Unit Sampling (MUS) made in MSEXcel, along with instructions and examples of how to determine the sample size, select the sample and evaluate the results.

American Institute of Certified Public Accountants (AICPA) offers a guideline on audit sampling in their publication “Audit Guide: Audit Sampling” (2014). Chapter 6 of the Audit Guide which will later be referenced explains in detail the characteristics of MUS, how to define the sample unit, select the sample and determine the sample size when using MUS, as well as an example with an evaluation of the sample size.

The foregoing literature will assist with defining the terminology in the upcoming sections, along with the offered insight into different publications regarding this topic.

Upon reviewing the literature, it can be concluded that aside from Bruce Wampler and Michelle McEacharn there are not many publications that discuss the topic of auditors building MUS in Excel.

3. METHODOLOGY

In this section, audit sampling and stratification will be defined, as well as the approach an auditor should take when creating tools.

Audit sampling is defined as the application of audit procedures to less than 100% of items within a population of audit relevance such that all sampling units have a chance of selection in order to provide the auditor with a reasonable basis on which to draw conclusions about the entire population (ISA 530, IAASB Handbook, 2018).

Stratification is defined as the process of dividing a population into sub-populations, each of which is a group of sampling unit which have similar characteristics (often monetary value) (ISA 530, IAASB Handbook, 2018).

In audit, sampling is used when an auditor, due to the nature of the transactions concludes that it is not necessary to test all of the transactions in the population, or when testing all of the transactions would require a large amount of time and resources, and therefore would be impractical and uneconomical. (Mijoč I., Mijoč J., 2011)

Mijoč and Mijoč also state the advantages and disadvantages of using sampling in audit. Lower costs, faster processing of data and results, flexibility and reliability are listed as advantages; while the lack of data for each unit in the sample and the additional employee training required adequately choosing a sample and extrapolating the mis-statements (over-statements and under-statements), are listed as disadvantages of using this method.

The principal sampling methods stated in the ISA 530 include random selection, systematic selection, haphazard selection (in the case of non-statistical sampling), block selection and monetary unit sampling. Most of these sampling methods are already implemented in GAS and can be implemented in Excel as well through various plug-ins available online.

As it was previously mentioned, the tool which is discussed in this paper is an example of monetary unit sampling. ISA 530 describes MUS as a type of value-weighted selection in which sample size, selection, and evaluation results in a conclusion in monetary amounts. The aforementioned leads to the conclusion that MUS is a type of attribute sampling. Attribute sampling is typically used to reach a conclusion about a population in terms of a rate of occurrence. MUS expresses this conclusion in dollar amounts instead of the rate of occurrence.



MUS is also a subset of a broader class of procedures referred to as probability proportional to size (PPS) sampling. The characteristic of PPS samples is that the probability of an item's selection is proportional to its recorded amount.

One of the advantages of using MUS would be that it is generally easier to apply than classical variables sampling, since it is based on attribute sampling theory and the auditor can easily calculate sample sizes and evaluate their results using a computer program (such as the provided example) or a calculator. It also does not require direct consideration of the population characteristics, and usually results in a highly efficient sample size.

MUS is especially useful when it comes to accounts receivable confirmation, loans receivable confirmation, tests of investment security pricing compared to published prices, inventory price tests in which the auditor anticipates less misstatements and the population does not contain a number of large understatements and in fixed-asset additions tests where existence is the primary risk.

One of the disadvantages of using MUS would be that it is not designed to test understatements of a population. Since the sample is selected proportional to size, it is less likely that many of the small recorded amounts will be selected, yet those units can potentially be significantly understated. Another disadvantage would be that if the expected amount of misstatements increases, the appropriate MUS sample size will also increase. In these cases, it might be more appropriate to use other sampling techniques (AICPA, Audit Guide: Audit Sampling, 2014).

In the process of creating a tool in Excel, or any other software for the purpose of auditing, auditors should consider the following:

1. The tool is universally applicable. Since the topic of this paper are tools created by small and medium sized auditing companies, it would be a large investment for them to create a solution that can only be applied to one specific scenario each time. Rather, the auditors should focus on creating a tool that offers a solution for multiple clients, with minor modifications. In the case of monetary unit sampling and stratification, an example could be that the tool performs equally regardless of the population size.
2. The tool has instructions built in it. This reduces the learning curve for employees and minimizes the chance of them making a mistake in the process. In the case of monetary unit sampling and stratification, an example of an instruction could be where to import the population, or whether the format of the imported population should be in a certain order.

3. The auditor should be able to explain the purpose and the results of the tool to Quality Control. With well-defined instructions and adequate understanding of the tool, quality control should come to the conclusion that the tool is appropriate for use and offers relevant results.

The example of the aforementioned MUS coded in Excel will be presented in the upcoming section.

4.RESULTS

In this section, the technical aspect of a tool which performs stratification and monetary unit sampling will be described, as well as visual examples that show the results of the implementation and the code.

The first sheet states the instructions for the proper use of the file. As an example of the instruction, the user is advised to not change any of the cell values and to take caution when importing a population into the population sheet.

The second sheet describes the initial parameters needed for the VBA code to function. Parameters such as materiality threshold, clearly trivial threshold, the amount of cells in the population, the amount of cells that will be in the strata, the sample interval and other necessary variables for the VBA code will be defined by the user on this sheet. Assessment of risk and its effect on the confidence level and confidence factors are also stated in this sheet, although they depend entirely on the methodology of the auditing company to define the factors and different risk levels, which is not the goal of this paper.

Figure 1. Initial parameters.

Materiality threshold	1.200.000,00
Clearly trivial threshold	48.000,00
Checksum 1	60
Checksum 2	61
Checksum 3 (last row of population)	66
Checksum 4 (stratum)	35
Checksum 5 (stratum - last row)	36
Choose desired confidence level: 80%	Confidence factor 1,6
Sampling interval:	750.000,00

Source: Author



The third sheet is the population sheet. In this sheet the user imports the population following the instructions from the first sheet. Once the population has been imported, along with the other data the user has defined on the second sheet where the initial parameters are, the process of stratification may begin.

The fourth sheet is the part of the stratum, which represents values lower than zero. Using the button on this sheet will extract all of the transactions that are lower than zero from the population and present them in the sheet.

The fifth sheet is the part of the stratum, which represents values that cross the materiality threshold. It checks whether each value from the population is higher than the materiality threshold defined in the initial parameters sheet and then extracts that transaction into the sheet.

The sixth sheet is the part of the stratum, which represents values that are clearly trivial. It checks whether the combined value of the lowest transactions is equal to or greater than the sum of the clearly trivial threshold defined in the initial parameters.

Figure 2. Clearly trivial stratum

Transaction	Period	Doc. type	Invoice number	Invoice date	Description	number	Account nr.	Partner	Debit	Credit	Transaction date	Doc. num.	Description of the activity	Data count
44	0	0	295	24-07-18	0	0	614000	0	0	3460	24-07-18	179	Activity 44, buyer S.S.	6
35	0	0	222	07-07-18	0	0	614000	0	0	3505	07-07-18	152	Activity 35, company JKI	0
13	0	0	71	29-04-18	0	0	614000	0	0	5294	29-04-18	68	Activity 13, buyer L.L.	0
23	0	0	153	06-06-18	0	0	614000	0	0	6560	06-06-18	104	Activity 23, buyer H.H.	0
55	0	0	360	26-10-18	0	0	614000	0	0	8869	26-10-18	237	Activity 55, buyer C.C.	0
12	0	0	66	17-04-18	0	0	614000	0	0	12080	17-04-18	66	Activity 12, buyer N.N.	0

Source: Author

The script takes into consideration all of the values that are lesser than the trivial threshold, sorts them by size and then performs a check whether the sum of the values is larger than or equal to the threshold. If the sum is larger than or equal, it deletes the last (largest) value and performs the check again. If the sum is smaller than the threshold, the script stops and delivers the extracted values.

The seventh sheet is the remaining stratum, and extracts all of the values that are not present in the previous sheets. The button on the sheet performs a check whether the transaction is already present in the aforementioned strata sheets. If a transaction is present, it is automatically skipped and the script moves onto the next transaction, only seeking the transactions that are not present in the previous sheets. Once the script has located all of them, it concludes the stratification process and displays the data for the user.

The eighth and the final sheet performs the monetary unit sampling. This sheet contains the final result, which is based on the remaining stratum from the seventh sheet. Once the script has been ran, it locates the lowest value in the remaining stratum from the previous sheet. The identified value will be the starting value for the calculation of the interval. The highest value for the interval is in the initial parameters sheet.

In the MUS code, the script performs an initial check to see whether the value of the interval is included in the first transaction. If the first transaction is smaller than the value, the script creates a „pool“ where it will store all the values that are below the first interval. Once it finds the

transaction, which contains the first interval in it, it checks whether the combined value of the pool and the last transaction that was added in it are larger than the interval, and in that case, subtracts the interval value from the pool. The MUS script repeats the same process until it has located all of the transactions that will form the sample.

After the sample is displayed, the auditor can then examine the sample size and decide whether the sample size was adequate and if MUS was an optimal procedure for the test.

On this sheet, aside from the MUS, other notable information is displayed to the auditor, such as:

- The interval, which is calculated via +Randbetween function using aforementioned variables
- The population value – the sum of the transactions in the remaining stratum
- The sample value – the sum of the transactions in the sample
- The number of transactions in the sample
- Percentage of the population tested – the ratio of the sample value and the population value, and
- The estimated sample size – based on the population value divided by the sampling interval value.



Figure 3. Monetary Unit Sampling

Transaction Period	Doc. type	Invoice num	Invoice date	Description	Descr. num	Account nr.	Partner	Debit	Credit	Transaction d	Doc. num.	Description of the activity	The first (random) interval
14	0	0	77	03-05-18	0	614000	0	0	994.818,00	03-05-18	69	Activity 14, buyer L.L.	788.142,00
17	0	0	97	13-05-18	0	614000	0	0	949.046,00	13-05-18	82	Activity 17, buyer T.T.	
18	0	0	101	16-05-18	0	614000	0	0	214.912,00	16-05-18	92	Activity 18, buyer A.A.	Population value
24	0	0	156	07-06-18	0	614000	0	0	377.318,00	07-06-18	108	Activity 24, company JKL	6.837.815,00
34	0	0	212	05-07-18	0	614000	0	0	446.859,00	05-07-18	151	Activity 34, company ABC	
40	0	0	266	15-07-18	0	614000	0	0	289.087,00	15-07-18	170	Activity 40, buyer P.W.	Sample value
47	0	0	309	01-08-18	0	614000	0	0	66.757,00	01-08-18	186	Activity 47, buyer G.B.	3.774.210,00
56	0	0	369	22-11-18	0	614000	0	0	435.413,00	22-11-18	240	Activity 56, buyer C.C.	
60	0	0	399	22-12-18	0	614000	0	0	442.676,00	22-12-18	300	Activity 60, company XYZ	Number of transac. in the sample
													9
													Percentage of pop. tested
													55,20%
													Estimated sample size
													9
													Monetary unit sampling

Source: Author

5. CONCLUSION

Our findings show that, while it is possible to implement certain procedures and audit processes in complementary software such as Excel, it is necessary for the auditor to weigh the benefits against the costs of creating such a tool. From a practical standpoint, any implementation of an automated sampling method should facilitate the auditing process in general.

From a technical standpoint, building this function into Excel requires the auditor invest time into learning how to code in VBA. While this can be time-consuming, once the auditor has sufficient knowledge of VBA, they can use their skills to implement other features and automate other processes in Excel, or gain better understanding of how Macros work. In general, this is a huge benefit to any auditor.

From a standpoint of quality control, as long as the auditor is prepared to explain the features of the program to quality control and that the results it provides are adequate, the quality control should accept auditors own tools, as there are no official tools advocated by the standards.

Finally, the results from the MUS tool are the same as they would be in any other tool that performs the same function. Stratification and MUS already exist in GAS. However, since small and medium sized audit companies sometimes cannot afford professional software, the results of this research should serve as an incentive for them to build their own functions into the software they use on a regular basis.

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THE ROLE OF INDEPENDENT DIRECTORS IN CORPORATE GOVERNANCE IN IT COMPANIES IN SERBIA

Danko Jevtović^{1*},
Nikola Stefanović²

¹PhD candidate,
Singidunum University,
Belgrade, Serbia

²Singidunum University,
Belgrade, Serbia

Abstract:

The Serbian Companies Law of 2011 established a modern regulatory framework for corporate governance in Serbia and introduced the position of an independent director. The role of an independent corporate director is in resolving the agency problem between owners and management and in improving a group decision-making process in the governance of companies. This paper analyses acceptance and the role of independent corporate directors in Serbia and their influence on business decision-making processes. The research was conducted on a relevant sample of IT companies in Serbia, and it aims to analyse the role of independent directors in IT companies in Serbia and to assess how directors value the benefits of independent directors in the decision-making process.

Keywords:

corporate governance, independent directors, business decision making.

1. INTRODUCTION

Corporate governance is a well-developed concept in a market economy. The institution of independent directors is an essential part of the corporate governance framework designed to improve trust in corporations. In Serbia, the economy is still in transition, and it is not significantly corporatized (Begović et al. 2008). As no recent studies focus on the role of independent directors in the country, it is important to analyse the state of corporate governance and the establishment of the role of independent directors in IT companies. Accordingly, this paper aims to investigate the practice of Serbian companies in the IT sector and the attitude of directors (board members) of these companies.

The paper also aims to give recommendations on how to improve corporate governance at the board level and take advantage of the role of independent directors to reduce the risk of the groupthink. The authors believe that better corporate governance would result in more transparent and trustworthy Serbian IT companies and, consequentially, more investments in and growth of the economy.

2. LITERATURE OVERVIEW

International Finance Corporation (IFC, Corporate Governance Manual, 2007) defines corporate governance as "the structures and processes by which companies are directed and controlled". The Organisation for Economic Cooperation and Development (OECD) adopts corporate governance definition from the European Central Bank as "procedures and processes according to which an organisation is directed and controlled".

Correspondence:
Danko Jevtović

e-mail:
danko.jevtovic.19@singimail.rs



In recent years, the number of scientific papers on corporate governance has increased substantially. Adams et al. (2010) estimate that "more than 200 working papers on boards have been written since 2003, when Hermalin and Weisbach published their original board literature survey". During that period, many other authors, such as Fields and Keys (2003), Carter et al. (2003), Farrell and Hersch (2005) contributed to this field.

Corporate governance is of utmost importance in generating investors' trust in companies. The McKinsey research finds, as reported by Watson et al. (2002), that, when making an investment decision, investors pay premiums for companies with good corporate governance. Researches also note that many as 63% of investors might avoid companies with poor governance, while as much as 33% of investors might completely avoid countries characterized as having poor governance.

Jansen and Meckling (1976) define the agency relationship as: "a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent". The European Corporate Governance Institute paper on Agency Problems, Legal Strategies and Enforcement (Armour et al., 2009) defines a potential conflict of interest between management and the company in making sure that professional management acts in the best interest of the owners (and not in their own self-interest). The institution of an independent director was designed to contribute to solving of the first agency problem (Jansen & Meckling, 1976), and a historical overview was provided by Baum (2017). The significant improvements were based on the seminal recommendations of the Cadbury Report of the Committee on the Financial Aspects of Corporate Governance (Cadbury, 1993). Large corporate scandals (Hill, 2004) in the 2000s (Enron Corp. etc.) prompted a significant review and further development of the corporate governance and institution of independent directors in particular, as recommended in the UK in the Higgs Report (2003).

The literature (Pechersky 2016) shows that independence and diversity have a positive effect on the decision-making process and board performance. The groupthink (Whyte, 1952) can be reduced by more independence, as Da and Huang (2015) find that the final results (wisdom) of groups can be enhanced by encouraging independent voices. On the other hand, the question of measurable benefit of board independence on corporate performance is very much open, as Bhagat and Black (1999) find no evidence that board independence leads to improved performance, and as explained by Adams (2017).

In the Winter's Report (2002), the High-Level Group of Experts recommends that, in European Union, listed

companies should make sure that their directors are independent and that their remunerations and any side dealing, which could lead to non-independence, are transparent.

2.1. Independent directors in Serbia

Significant regulatory changes followed the transition of the economy of Serbia. The Serbian Company Law of 2011 modernised the regulation of business entities in line with EU trends. Vasiljevic (2013) summarises that the Serbian Company Law is modern, ahead of its time, and that it incorporated many EU future guidelines.

The institution of an independent member of a management board was introduced by the Serbian Company Law of 2004, but only the new Company Law of 2011 clearly defined the role of an independent director (supervisory board member in a dual board), in line with the EU recommendations (Winter, 2002).

Independent director (Companies Law of Serbia, 2011, Art. 392) is a: "Person not affiliated to directors, and a person who, over the last two years: 1) Has not been an executive director, or employed in the company, or in some other company affiliated to the company in terms of [the] Law; 2) Has not owned more than 20% of the share capital, and has not been employed or otherwise hired by some other company which has generated more than 20% of its annual revenues from the company over that period; 3) Has not received payments from the company or its affiliated persons in terms of [the] Law; 4) Has not owned more than 20% of the share capital of a company affiliated with the company in terms of [the] Law; 5) Has not been engaged in the conduct of an audit of the company's financial statements." Furthermore, a statement of the application of a corporate governance code is obligatory for all public joint-stock (listed) companies in Serbia, and they are obliged to have at least one independent director.

There is a clear gap in the scientific literature and general business publication between recommendations on the institution of an independent director, on the one hand, and corporate governance practices in Serbian corporations on the other. Analysing that gap might help bring about recommendations that would point directions for governance improvements.

3. HYPOTHESIS

Taking into consideration the reasons for establishing the institution of independent directors, experiences in the EU, and the intent of the Serbian regulations, the aim of this paper is to assess whether the directors of Serbian IT companies value the role of independent directors in



business decision-making processes as significant, and whether directors believe that independent directors reduce the groupthink risk.

4. METHODOLOGY

Belgrade Stock Exchange Prime Listing has only four companies, the Standard Listing has only three, and the unregulated market has only 432 listings¹. Begović et al. (2008) found that: "The stock market in Serbia is relatively new and not very developed" (the quote by Petronijević, 2018). Therefore, the strength of corporate governance in a company is still not considered an essential mechanism for investors to evaluate the risks of investing.

This paper focuses on large IT companies in Serbia. It can reasonably be expected that technologically more modern companies could also be more modern organisationally. The companies were selected on the following criteria² (*data from FY 2018, the most recent data available at the time of the research*):

Table 1. Companies selection criteria

Revenue (FY 2018) ³	> 120,000,000 dinars (>€1M)
Employees	>=50
Business activity	IT-related
Serbian companies	No representative offices

Table 2. Statistics for selected companies (FY 2018)

Number of companies	83
Total employees	10,549
Average employees	127
Median employees	85
Total revenue	€ 1 billion
Average revenue	€ 6 million
Median revenue	€ 12 million

Source: Authors' calculations

The companies in the selected group exhibit significant business difference. All the companies are in the IT sector based on the official classification of business activities. Still, they operate in different business lines (companies also vary in size, assets, and revenue).

The survey methodology³ focused on the questionnaire directed to individual directors in the selected companies.

For the research group, the authors selected all directors (authorised persons) from all selected IT companies.

Table 3. Directors (board members)

Selected companies	83
Total directors	269
Foreign citizens	19% (52)
Females	18% (48)
LinkedIn profiles	73% (198)
Questionnaire filled	14% (37)
Answers with an identifiable person	11% (30)
Response rate (total)	14%
Response rate (contacted)	39%

Source: Authors' calculations

The surveyed persons were asked to self-evaluate the governance system in their company, the role of independent directors, and the influence of independent directors on the quality of business decisions.

5. RESULTS AND DISCUSSION

The results of the questionnaire showed the following:

Table 4. Survey results⁴

Directors answered	37
Companies with answers	30% (25/83)
Foreign ownership	54% (20)
Minority shareholders exits	62% (23)
Difference ownership vs management	78% (25)

Source: Authors' calculations

Table 5. Position in the company

CEO (general manager)	46% (17)
Executive director	16% (6)
Non-executive director	2.7% (1)
Independent director	0% (0)
Co-owner (informal board)	5.4% (2)
Authorised person	24% (9)
Other	5.4% (2)

Source: Authors' calculations

Based on the results, in the significant majority of the companies, the governance is important, as 78% (n=25/32) of the respondents state that, in their companies, there is a difference between ownership and governance/management. However, governance structures are



not well developed. Only 2.4% (n=2/83) companies are joint-stock companies (open/public or closed), and the rest are limited liability companies – not required to have boards. The respondents in 22% (n=7) said their companies have a formal board. In 88% (n=28) cases, the president of the board is CEO or the principal owner(s).

The non-executive directors are present in 41% of the companies (n=13/32), but independent directors in just in one (3% n=1/32).

5.1. Opinions of the directors

The observed opinions of the surveyed directors show that they value good governance practices more than can be implied from the observed patterns. The majority of responders (56%, n=19/32) believe that the existence of independent directors is valuable for business decision-making.

In the companies that don't have independent directors, the majority of responders believe they don't need them. Only 21% (n=6/28) believe in some level of usefulness of independent directors⁵.

In the control question, most of the responders (55%, n=16) confirmed that independent directors have a duty of loyalty to the company. Still, significant number believes that an independent director owns loyalty to owner/shareholders (31%, n=9), management (7%, n=2) or to the one who appointed them (7%, n=2).

In the multiple-choice question: "What are the benefits of an independent director for the company?"

Table 6. Benefits of independent directors

They bring a new business outlook	66% (19)
They bring outside experiences	52% (15)
They improve the quality of business decisions	48% (14)
They improve deliberations in a board	45% (13)
They reduce the groupthink risks	38% (11)
They help in lobbying	34% (10)

Source: Authors' calculations

Most of the respondents believe that independent directors reduce the risk of mistakes in the business decision due to the groupthink. The majority (59% n=17) believe it only partially⁶.

The survey results indicate possible ways to improve directors' understanding of their duties, board group dynamics, and, ultimately, the quality of the business decisions in the board. Only 12% (n=3/25) of the respondents had some form of onboarding training. The majority of respondents (56% n=14/25) state that their boards evaluate their performance, but from the comments, it was concluded that most of the evaluations are focused on the

managerial KPIs, not on issues related to board governance. Only 12% (n=3/25) of the respondents declared that they had in-company nomination policy, in 28% (n=7) is the decision by the owner (shareholders assembly), but 60% (n=15) don't have any nomination policy.

One of the important global trends is the automatization of the decision-making process using business expert systems or AI technology. Even though surveyed directors are from IT companies, automatization in business decisions is not present. Only one (4% n=1/25) respondent is using AI/automatization, 20% (n=5) are considering it, but the majority 76% (n=19) do not consider it at all.

6. SUMMARY

Corporate governance in emerging markets is not a well-researched subject. At the IFC Global Corporate Governance Forum, the researchers Ararat and Dallas (2011) find that less than 1% of corporate governance research papers focus on emerging markets. Most research that analyses global governance in emerging markets doesn't mention Serbia (Classens & Yortoglu for IMF, 2012; Isaksson for OECD, 2019).

Researches in Serbian usually focus on government-owned enterprises, banking sector or joint-stock corporations listed on Belex⁷, as some data is publicly available. The authors didn't find any study that examined the attitude of directors in the IT sector. Finally, the authors decided to base the conclusion and the recommendation on the perceived gap between generally accepted recommendations at the EU level and the practice observed in this research.

6.1. Limits of the research and possible next steps

The principal limit for this research was the structure of the economy in Serbia, and very few significantly larger joint-stock companies with well-developed governance in the selected IT sector (only 2.4% joint-stock companies)⁸.

The authors believe that similar research can be done on the directors of government-owned enterprises. Another interesting research, on the attitude of directors, could be done in the banking industry, as it is highly regulated with comparable financial reports, and with mandatory independent directors.

One of the exciting developments that can be expected in the future is the usage of AI and machine learning. One of the observed exciting ideas is to use machine learning algorithms to help select directors (Erel et al. 2018).

7 Belgrade Stock Exchange jsc, Belgrade, Serbia www.belex.rs/eng
8 Source: Authors' calculations.



6.2. Recommendations

IT companies that want to improve trust and prepare for the future can do significant steps in the corporate governance area: 1) Formalize governance structure – make a clear separation between ownership, governance, and management; 2) Include independent directors in the board; 3) Appoint a non-executive director as the board chair (or lead director); 4) Educate directors in the role of the board, their duties, and specifics of the group decision-making process; 5) Prepare onboarding process for newly appointed directors; 6) Analyse skills and diversity of directors and identify gaps that should be filled; 7) Formalize nomination policy (including independence) for selection and appointment of new directors; and 8) Have formal regular board self-evaluation and feedback for individual directors.

7. CONCLUSION

This paper analyses corporate governance practices in IT companies in Serbia. The research shows a significant disconnection between the development of formal governance structures in IT companies and the observed attitude of the surveyed directors.

The research also shows perceived lack of the need for a better governance structure in IT companies. Good governance is necessary to create a trust that is needed to attract capital by showing that investments and rights of minority shareholders and creditors are protected, and risks are managed.

The surveyed directors generally show more understanding of corporate governance that is needed in the Serbian IT business environment. Companies that want to attract investments will have to have proper governance structures and demonstrate successful management of the agency problems. That will require professional directors.

The authors believe that market and regulatory forces will drive the need for better governance, and that more research is needed to understand the specifics of the Serbian IT market.

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THE INFLUENCE OF PANDEMIC COVID-19 ON CYBER-SECURITY ON THE SERBIAN COMPANIES

Lidija Barjaktarović^{1*},
Sanja Kekić²

¹Singidunum University,
Belgrade, Serbia

²ISACA Belgrade Chapter,
Belgrade, Serbia

Abstract:

The subject of the research is to determine the influence of pandemic COVID-19 on cyber-security of the Serbian companies. The aim is to stress the importance of cyber-security risk management in today's business world and permanent learning and investing in cyber-security risk prevention and detection controls. Two online researches conducted in the second quartile of 2020 (with almost 70% response rate) by using Zoom Pulling Feature had the following conclusions: the pandemic of COVID-19 has had influence on cyber-security of Serbian companies in terms of increased number of employees that had access to the corporate network from home, introduced risk management measures for mitigation of potential cyber-attacks and intensity of cyber-attacks on the company's system.

Keywords:

cyber-security, cyber-security risk management, COVID-19, lock-down.

1. INTRODUCTION

The subject of the research is to determine the influence of pandemic COVID-19 on cyber-security (CS) of the Serbian companies. The aim is to stress the importance of CS risk management in today's business world and permanent learning and investing in CS risk prevention and detection controls.

Business risks are part of a company's life. Global and local markets are exposed to different risks, and it has impact on a company's performances (Barjaktarovic, 2015). Business risk assessment and management is being impacted by "Black swans" (Taleb, 2010), and currently global situation, including the Republic of Serbia, can be described the same. Especially, in terms of influence of pandemic COVID-19 on CS of the Serbian companies.

In previous period there were different surveys related to the top ten risks in company's business where CS risks were recognized as increasingly significant in the future period.

According to the Federation of European Risk Management Association (FERMA) in 2016 cyber-attack/data privacy was ranked as 7 of 10 top business risks. They estimated low level of satisfaction with mitigation strategies. 2018 was in digital transformation, while 2019 was in preparing for cyber insurance. They stated that in the practice the only positive effect of cyber-event is that companies had become aware of cyber risks they face and that they need to manage their CS exposure. However, many companies are trying to find the most convenient way to do it. (FERMA, 2018) According to Bacanin Dzakula & Strumberg (2018), the cloud organization can be protected if they understand and know from what they should be protected, and can quantify potential damage which can be caused by the attack.

Correspondence:
Lidija Barjaktarović

e-mail:
lbarjaktarovic@singidunum.ac.rs



BDO's survey found out that cyber-attacks are on the 6 of top 10 major risks for the likelihood of occurrence in 2017. They stressed that cyber risks are the third challenge for managing in the next years, and recommended adaptive agility strategy for risk management (BDO, 2017). BDO's Report (2019) suggested that concerns had narrowed from general to more specific. The risk of computer crime such as hacking or malicious viruses comes second, with economic slowdown and slow recovery ranking third.

Allianz Risk Barometer has recognized the importance of cyber-incidents in the top two risks since 2018. In 2018 top two risks were: business interruption – cyber incidents, and cyber incidents – such as new threats like “cyber-hurricanes”. In 2019 and 2020, cyber joins business interruption as a leading global risk for companies for the first time. Other important risks are business interruption and climate change.

AXA's survey (2019) findings are that CS risks were in top ten risks in terms of significance, with increasing impact and challenge for managing. PROTIVITT's study (2019) identified the following 3 top risks for 2019: cyber-threats (as 4-ranked), rapid speed of disruptive innovations and new technologies (as 6-ranked) and privacy/identity management and information security (as 7-ranked). EY & IIF survey (2019) identified as the top main risks in the following decade: protecting privacy to maintain trust (as 3-ranked) and fighting a cyber war in banks and across the system (as 4-ranked). Deloitte's survey (2019) key risk findings were: 1) overriding significance of cyber-risks, 2) increasing focus on non-financial risks and 3) data is the main priority for risk management and IT systems.

It can be concluded that managing CS risk will be a big challenge for all companies in the future.

The article consists of 4 chapters. Introduction is the first chapter. Methodology is explained in the second chapter. Research results are presented in the third chapter. The conclusion is the last chapter.

2. METHODOLOGY

On 04/27/2020 and 06/04/2020, ISACA Belgrade Chapter (ISACABC) organized panel discussions related to the influence of pandemic COVID-19 on CS, during which online questionnaires by using Zoom Pulling Feature. Both panels were in the function of continuous education. Therefore, participants had to fulfil application form with relevant personal data in order to get a proper certificate after the panel. ISACABC sent invitation on 176 email addresses and statistics were as follows: 1) on the first panel: 102 applications, 79 participants, 55 respondents; 2) on the second panel: 79 applications, 54 participants, 37 respondents.

Response rates in comparison with the number of present participants were: 1) 69.62% on the first panel, 2) 68.52% on the second panel; and they are relevant for making adequate conclusions. On both panels participants: 1) came from following industries: financial sector – 47%, telecommunication sector – 21%, information technology – 23%, consulting – 7% and other -2%; 2) had predominant expertise in following fields: information security (22%), audit (21%), information technology audit (20%), implementation of security solutions (19%) and risk management (18%).

Both questionnaires had 6 questions with offered answers. Questionnaires were prepared in cooperation between ISACABC and Singidunum University Belgrade (SUB). Questions will be presented in the Research Results chapter. The data analysis employed the use of descriptive statistics. There were two online surveys in order to compare the difference between two periods during COVID -19, i.e. defined as at the time of COVID-19 lock-down and one month after it.

3. RESEARCH RESULTS

On the first panel, on the first question related to the increase of number of employees that had access to the corporate network from home, 89% of participants answered positively, i.e. it had increased (Table 1). It goes in line with research of the AM Cham Serbia (2020) where 95% companies- members allow work from home.

25% of participants said that 80% - 100% of employees worked from home. Two equal groups of participants (20% each) answered that 40-60% and 60%-80% of employees worked from home. 13% of participants said that 100% of employees had access to the corporate network from home. Two equal groups of participants (11% each) answered that 0% and 20-40% of employees worked from home.



Table 1. Review of answers on the question: How much has the number of employees accessing to the corporate network from home increased in your company?

Offered answers	No of participants	Relative participation (%)
0%	6	11
20% - 40%	6	11
40% - 60%	11	20
60% - 80%	11	20
80% - 100%	14	25
100%	7	13

On the second question related to the intensity of cyber-attacks on the company's system at the time of COVID-19, 41% of participants answered that it was increased (Table 2). It is below global trend, 58% ISACA Global research / ISACAGR/participant members said that it was increased (ISACA, 2020). This difference could show us concern that some of the cyber-attacks were not detected.

In terms of increased intensity of cyber-attacks, the structure of answers was as follows: 20% of participants

said slightly increased, 16% of participants answered increased but not significantly and 5% of participants said significantly increased. 33% of participants said that according to the company's policy it is prescribed not to answer on this type of question. 25% of participants answered that the intensity of cyber-attacks at the time of COVID-19 stayed the same.

Table 2. Review of answers on the question: To the best of your knowledge in your company, what was the intensity of cyber-attacks at the time of COVID-19?

Offered answers	No of participants	Relative participation (%)
Company's policy prescribed not to answer on this type of question	18	33
Same	14	25
Increased but not significantly	9	16
Slightly increased	11	20
Significantly increased	3	5

On the third question related to the types of cyber-attacks at the time of COVID -19, 60% of participants answered mainly the same (Table 3), where 45% of participants said the same but used COVID-19 as the main word and 15% answered the same. 25% of participants

said that types of cyber-attacks happened at the time of COVID-19 were somehow different. 15% of participants said that according to the company's policy it is prescribed not to answer on this type of question.

Table 3. Review of answers on the question: To the best of your knowledge, which types of cyber-attacks happened at the time of COVID 19?

Offered answers	No of participants	Relative participation (%)
Same	8	15
Same just use COVID-19 as main word	25	45
Company's policy prescribed not to answer on this type of question	8	15
Something different	14	25



On the fourth question related to the company's number of employees in charge of CS, 98% of participants answered positively i.e. the company has one or more employees in charge of CS (Table 4). Two equal groups of participants: 1) (24% each) said that they had 1 and 1-3 employees in charge of CS, 2) (18% each) answered that they had 5-10 and above 10 employees responsible for CS. 14% of participants answered that they had 3-5 employees in charge of CS. 2% of participants said that they do not have an employee in charge of CS.

Although the answers show a positive result in the sense that companies have employees in charge of CS, it also shows a worrying result, because 50% of companies do not have or have one to three employees in charge of CS. It goes in line with global trends, only 51% ISACAGR participant members are highly confident in their security team's ability to detect and respond to cyber threats during the pandemic (ISACA, 2020).

Table 4. Review of answers on the question: To the best of your knowledge in your company, how many employees are in charge for CS?

Offered answers	No of participants	Relative participation (%)
0	1	2
1	13	24
1 - 3	13	24
3 - 5	8	14
5 - 10	10	18
above 10	10	18

On the fifth question related to the company's attitude toward CS prevention after COVID 19, 56% of participants

said better, 40% of participants answered the same and 4% said worse (Table 5).

Table 5. Review of answers on the question: What will be the company's attitude toward CS prevention after COVID-19?

Offered answers	No of participants	Relative participation (%)
Better	31	56
Same	22	40
Worsted	2	4

On the sixth question related to the reporting line responsibility of the company's Chief Information Security Officer (CISO), 82% of participants answered to the higher managing and ownership function (Table 6). 27% of participants said that the CISO reports to the Executive Director. 20% of participants answered that the CISO

reports to the General Manager. 18% of participants said that the CISO reports to IT Directors. 16% of participants said that the CISO reports to the Group CISO. Two equal groups of participants (9% each) answered that the CISO reports to the Executive Board i.e. Supervisory Board and the owner of the company.

Table 6. Review of answers on the question: To whom report the CISO in your company according to the organizational structure?

Offered answers	No of participants	Relative participation (%)
IT Directors	10	18
General Manager	11	20
Group CISO	9	16
Executive Director	15	27
Executive Board i.e. Supervisory Board	5	9
Owner of the company	5	9



It can be concluded that: 1) there was the increased number of employees which had access to the corporate network from home (89% of participants); 2) the intensity of cyber-attacks on the company's system at the time of COVID-19 was increased (41% of participants). It is below global trend (58%), and this difference could show us concern that some of the cyber-attacks were not detected. 3) Types of cyber-attacks at the time of COVID-19 were mainly the same (60% of participants) i.e. 45% of participants said the same but used COVID-19 as the main word and 15% answered the same. 4) The company's attitude towards cyber security prevention after COVID 19 would be better (56% of participants); 5) there was majority of companies which had one or more employees in charge of CS (98% of participants). This can be considered at the same time as positive and worrying result. It is positive in a way that companies have employees in charge of CS; and it is worrying in a way that 50% of companies do not have

or have one to three employees in charge of CS. It goes in line with global trends (51%). 6) CISO's reporting line responsibility is to the higher managing line and ownership function (82% of participants).

On the second panel, on the first question related to the decreased number of employees that had access to the corporate network after the lock-down, 65% of participants answered positively i.e. the number had decreased (Table 7). In terms of decreased number of employees, the structure of answers was as follows: 24% of participants said it was 0%-20%, 19% of participants answered it was 20%-50%, 14% of participants said it was 50%-80%, 5% of participants answered it was 100% and 3% of participants said it was 80%-100%. 35% of participants answered that there was no decreased number of employees accessing to the corporate network from home in their company after the lock-down.

Table 7. Review of answers on the question: How much has the number of employees accessing to the corporate network from home decreased in your company after the lock-down?

Offered answers	No of participants	Relative participation (%)
0%	13	35
0-20%	9	24
20% - 50%	7	19
50% - 80%	5	14
80% -100%	1	3
100%	2	5

On the second question related to the intensity of cyber-attacks after the lock down, 78% of participants answered the same, as it was in the previous period (Table 8).

Two equal groups (11% each) said that it slightly decreased and noticeably decreased, but not significant.

Table 8. Review of answers on the question: To the best of your knowledge in your company, what was the intensity of cyber-attacks after the lock-down?

Offered answers	No of participants	Relative participation (%)
Slightly decreased	4	11
Same, as it was during the lock-down	29	78
Noticeably decreased, but not significant	4	11

On the third question related to the types of cyber-attacks happened after the lock-down, in comparison with the previous period, 85% of participants answer mainly the same (Table 9), where 55% of participants said the same

and 30% of participants answered the same but they used COVID-19 as the main word. 15% of participants said different.



Table 9. Review of answers on the question: To the best of your knowledge, which types of cyber-attacks happened after the lock-down, comparing to the previous period?

Offered answers	No of participants	Relative participation (%)
Different	6	15%
Same	20	55%
Same just use COVID-19 as main word	11	30%

On the fourth question related to the intensity of impact of cyber-attacks on a company's assets (damage) after the lock-down, 84% of participants answered mainly the same (Table 10), where 44% of participants said the same, 25% of participants answered slightly increased and 16% of participants said slightly decreased. 16% of participants answered significantly increased.

Table 10. Review of answers on the question: What is your opinion on the intensity of impact of cyber-attacks on a company's assets (damage) after the lock-down?

Offered answers	No of participants	Relative participation (%)
Significantly increased	6	16
Slightly increased	9	25
Slightly decreased	6	16
Same	16	44

On the fifth question related to the introduced measures for risk mitigation of potential cyber-attacks during and after the lock-down period (Table 11), 71% of participants answered yes, where 47% said it was applied essentially and 24% answered it was applied formally. 29% of participants said that companies didn't do anything comparing the lock-down period in terms of introducing appropriate measures in order to mitigate the risks of potential cyber-attacks during and after the lock-down period.

Table 11. Review of answers on the question: Did companies introduce appropriate measures in order to mitigate the risks of potential cyber-attacks during and after the lock-down period?

Offered answers	No of participants	Relative participation (%)
Yes - formally	9	24
Yes - essentially	17	47
Nothing more comparing the lock-down period	11	29

On the sixth question related to the probability of cyber-attacks consequences on the company's business after the lock-down (Table 12), 94% of participants answered mainly the same, where 53% said the same, 25% answered slightly increased and 16% said slightly decreased. 6% of participants answered significantly increased.

Table 12. Review of answers on the question: What is your opinion about the probability of cyber-attacks consequences on the company's business after the lock- down?

Offered answers	No of participants	Relative participation (%)
Significantly increased	2	6
Slightly increased	9	25
Slightly decreased	6	16
Same	20	53



It can be concluded that: 1) there was the decreased number of employees who had access to the corporate network after the lock-down (65% of participants); 2) the intensity of cyber-attacks after the lock down was the same as it was in the previous period (78% of participants); 3) the types of cyber-attacks happened after the lock-down, in comparison with the previous period were mainly the same (85% of participants), i.e. 55% of participants said the same and 30% of participants answered the same but COVID-19 is used as a main word. 4) The intensity of impact of cyber-attacks on a company's assets (damage) after the lock-down stayed mainly the same (84% of participants) i.e. 44% of participants answered the same, 25% of participants answered slightly increased and 16% of participants said slightly decreased. 5) The introduced measures for risk mitigation of potential cyber-attacks during and after the lock-down period were appropriate (71% of participants) i.e. 47% said it was applied essentially and 24% answered it was applied formally. 6) The probability of cyber-attacks consequences on the company's business after the lock-down stayed mainly the same (94% of participants) i.e. 53% said the same, 25% answered slightly increased and 16% said slightly decreased.

4. CONCLUSION

Researches conducted in relation to the influence of pandemic COVID-19 on CS of Serbian companies, in cooperation of ISACABC and SUB had good response rates (almost 70%).

98% of participants said that their companies had one or more full time employees in charge of CS area. This can be considered at the same time as positive and worrying result. It is positive because companies have employees in charge of cybersecurity; and it is worrying due to the fact that 50% of companies do not have or have one to three employees in charge of CS. It goes in line with global trends (51%).

82% of participants answered that the company's CISO reporting line responsibility is to the higher managing and ownership function.

There was the increase of number of employees that had access to the corporate network from home during and after the lock-down period. In initial phase there was an increase of 89%, after the lock-down it decreased up to 24%. It is important to notice that majority of companies has become virtual offices, which increases possibility for execution of cyber risks. It means that companies' assets are permanently exposed to damage caused by cyber-attacks, and it requires further education of employees in this field of expertise. Furthermore, it applies on further investments in adequate resources (people and tools) in order to obtain adequate CS risk management.

41% of participants answered that the intensity of cyber-attacks on the company's system at the time of COVID-19 increased. 78% of participants said that intensity of cyber-attacks after the lock down was the same, as it was in the previous period. It can be noticed that there exists concern that some of the cyber-attacks were not detected (comparing to global trends) and maybe companies' security teams are not enough to detect and respond to cyber threats during the pandemic.

60% of participants answered that types of cyber-attacks at the time of COVID -19 are mainly the same, where 45% of participants said the same but COVID-19 is used as the main word and 15% answered the same. 85% of participants said that types of cyber-attacks happened after the lock-down were almost the same, in comparison with the previous period. 55% of participants said the same and 30% of participants answered the same but they used COVID-19 as the main word.

Estimation of 56% respondents regarding the company's attitude toward CS prevention after COVID 19 would be better. Furthermore, 71% of participants said that their companies introduced adequate measures for risk mitigation of potential cyber-attacks during the lock-down. However, the way of applying the measures was different, i.e. 47% applied essentially and 24% formally.

84% of participants answered that the intensity of impact of cyber-attacks on a company's assets (damage) after the lock-down was mainly the same, where 44% of participants said the same, 25% of participants answered slightly increased and 16% of participants said slightly decreased.

Majority of respondents (94%) said that the probability of cyber-attacks consequences on the company's business after the lock-down would be mainly the same, where 53% said the same, 25% answered slightly increased and 16% said slightly decreased.

It can be concluded that pandemic of COVID-19 has had influence on CS of Serbian companies in terms of increased number of employees that had access to the corporate network from home, introduced risk management measures for mitigation of potential cyber-attacks and intensity of cyber-attacks on the company's system. Furthermore, it has had impact on further education of employees in CS field of expertise.

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ECHO STATE NETWORKS USAGE FOR STOCK PRICE PREDICTIONS

Lidija Barjaktarović^{1*},
Marko Barjaktarović²,
Snežana Konjikušić³

¹Singidunum University,
Belgrade, Serbia

²School of Electrical Engineering,
University of Belgrade,
Belgrade, Serbia

³FEFA Faculty,
University Metropolitan,
Belgrade, Serbia,

Abstract:

The subject of research is the consideration of potential use of Echo State Networks (ESN) for prediction of stock prices. The reasons are: 1) stock prices show non stationary behaviour and ESN is well suited to time series prediction of chaotic systems; 2) implementation in optical domain can bring very fast inference and financial market transactions requires prompt brought decisions; 3) training time of ESN is short and doesn't require special hardware like training deep Feedforward Neural Network (NNs). Although there is only a few studies about using ESN for prediction financial data (pricing of securities subject of trade, and their volumes), it can be concluded than ESNs have great potential to be used in prediction of the stock prices. Having in mind the intention of the Serbian government to stimulate issuing of bonds, ESN can be applied on Belgrade Stock Exchange.

Keywords:

Echo State Networks, Reservoir Computing, predictions, stock prices.

1. INTRODUCTION

Time series analysis is widely used in many domains, such as speech recognition, cyber-attack detection, structural health monitoring, medical diagnostics, economics, risk management, etc.

Outcome prediction has been very popular recently, even more so with aid of deep learning algorithms. However, traditional algorithms based on Feedforward Neural Network (NN) are not suited for dynamic systems, where historical data must be incorporated in predictions (Gao et.al, 2020). This is a special problem with nonlinear and nonstationary behaviour, which can be hidden in the signals, and feed forward NNs can fit very well to historical data, but poorly performing with contemporary data when there is inherent uncertainty in the signal.

There are a lot of algorithms for time series forecasting, with recurrent neural networks (RNN) being among the most commonly used. In RNNs, signals passing through recurrent connections can be viewed as a memory element in the network while memory contents offer additional gain for predicting future values. However, RNN is difficult to train (Schaetti et.al, 2016) due to the vanishing gradient problem. This is the result of optimizing procedure used to train neural network called backpropagation. The backpropagation uses derivatives of current prediction error between each layer to "learn" from data. In spite of that, with too many layers (deep NNs can have more than 100) and with orbiting in returning branches, error derivatives become very small and eventually updating factor disappears, reducing in poor network performance. In order to cope with this problems, several method exists like LSTM (Long-short term memory), residual deep NNs with skip connections, Echo State Networks (ESN) and others.

Correspondence:
Lidija Barjaktarović

e-mail:
lbarjaktarovic@singidunum.ac.rs



Among them ESNs gain lot of attention, especially recently when researcher implement ESN architecture in photonic domain (Photonic Computing) (Tan et.al, 2019). Traditionally, after training NN, which can be time consuming for deep architectures, trained NN is used for prediction (or inference in Machine Learning vocabulary). Although inference is much faster than training, it requires computation power for real time application. Specialized hardware for edge computing like TPU (Tensor Processing Unit, Google Coral /Coral, 2020/), NPU (Neural Processing Unit, Intel Movidius /Intel, 2020/), and GPU (Graphics Processing Unit, like Nvidia Jaton Nano /Nvidia Developer, 2020/) are optimized for computation and more energy efficient than standard CPU, but they still have delay and use some energy, both being proportional to the number of nodes in NN. Using photonic computing, inference time is proportional to propagation of optical signal which is at order of ps (10^{-12} second) and power dissipation is negligible to standard edge devices (Brunner et.al, 2013). Additionally ESN can be implemented in photonics using only single dynamics node (like nonlinear optical amplifier) and one feedback line (optical fiber) and there is lot of research attention to optimized optical ESN (Tanaka et.al, 2019), as a potential candidate for all optical NN, but that is out of scope of this paper. The subject of research is consideration of potential use of ESN in stock price prediction. There are different reasons for it. Firstly, stock prices show non stationary behaviour and ESN is well suited to time series prediction of chaotic systems. Secondly, implementation in optical domain can bring very fast inference and financial market transactions requires prompt brought decisions. Finally, training time of ESN is short and doesn't require special hardware like training deep NNs.

The article consists of 4 chapters. Introduction is the first chapter. Basic theory of ESN is the second chapter. The application of ESNs for prediction of stock prices is the third chapter. The conclusion is the last chapter.

2. BASIC THEORY OF ESN

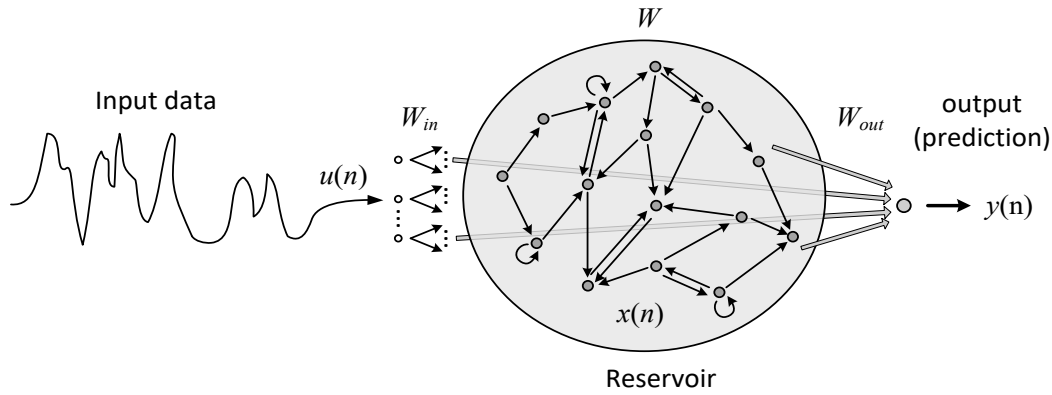
ESN is well suited for non-stationary signals. For a signal it is said that it is stationary if its statistical properties like mean and standard deviation do not change over time (remain constant). Additionally, standard methods for analysing stationary signals require that signal autocorrelation is not varying over time. Stationarity is required for building time series model and prediction of future values. Some earlier ways to deal with non-stationary signals it to "stationarize". It means to decouple non stationarity into several different signal which are stationary, make prediction for each decoupled signal and join all predictions in final outcome. However, sometimes mixing of individual predictions is not straightforward, due to unknown underlying chaotic properties of signal, like stock prices.

In order to overcome the non-stationarity problems, recently ESN has been developed. Essentially ESN is a RNN with a loosely connected hidden layer. This hidden layer has a few hundred nodes, standard values are between 400 and 800, but that number depends on prediction problem and optimal value is found during optimization process. Each node contain one value, which is constant between two time samples. Current node's value depends nonlinearly on contemporary input of network and values from previous moment of that and neighbouring nodes. Inputs and nodes are connected by weights which are randomly initialized. Those weights are not changed during training process and this is one of advantages of ESN. The hidden layer is called a "reservoir" and for that name, ESN is also stated as reservoir computing. The role of reservoir can be observed as nonlinear function which expand dimensionality of input vector, making predictions more accurate.

The prediction (classification or regression, depends on task) is achieved using linear combination of all nodes and current inputs. In figure 1, which shows basic architecture of ESN, the prediction is done by output layer. The weights in output layer are also randomly initialized, but they change during training. The training performs quite fast, due to small numbers of trainable parameters compared to deep NNs (sometimes more than hundred million). If the task is to predict one value in future, number of parameters is equal to sum of number of nodes in reservoir and number of inputs. If classification should be accomplished or prediction of several values in future is a required number of parameters, it is sum of number of nodes and inputs multiplied by number of classes or future values, which is not more than few thousands.



Figure 1. Basic architecture of ESN



Source: Authors' prepared

Due to the fact that only one layer needs to be trained, there is no problem with vanishing gradient. Also, ESN is very computationally efficient and easy to train and above all, several researches shows that ESN works surprisingly well when input is chaotic time series, outperforming other methods for modelling dynamical nonlinear systems.

Mathematically, the prediction y at current time sample n can be written as (Lukoševičius, 2012):

$$y(n) = W_{out}[u(n); x(n)] \quad (1)$$

where $u(n)$ is vector of current inputs, $x(n)$ represents current state of reservoir (value at each of N nodes, where N is number of nodes) and W_{out} is output weight matrix whose coefficients are trainable. If dimension of output vector y (column vector) is s and dimension of input vector u is p then dimension of weight matrix is $s \cdot (p+N)$. For example, as input stock price from $p = 100$ previous days are used, reservoir has $N = 400$ nodes and ESN predicts stock prices for next $s = 5$ days. In equation 1 $[u(n); x(n)]$ represents column vector obtained by concatenation of vector $u(n)$ and $x(n)$.

Updating reservoir $x(n)$ is achieved using following equation:

$$x'(n) = \tanh[W_{in} \cdot u(n) + W \cdot x(n-1)] \quad (2)$$

$$x(n) = (1 - \alpha) \cdot x(n-1) + \alpha \cdot x'(n) \quad (3)$$

where $x(n)$ is vector with state (numerical value) of all nodes in reservoir, \tanh is hyperbolic tangent function, but other function can be used as nonlinear activation, W_{in} is input weight matrix with dimension $N \cdot p$, W is reservoir state $N \cdot N$ matrix and α is leaking parameter which defines how fast memory is fading out.

If true value for output is y_{target} than Root Mean Square Error (RMSE) is commonly used as an estimation of ESN accuracy:

$$E(y, y_{target}) = \frac{1}{s} \sum_{i=1}^s \sqrt{\frac{1}{k} \sum_{n=1}^k (y_i(n) - y_{target,i}(n))^2} \quad (4)$$

where k is dimension of training set (number of pairs with input $u(n)$ and corresponding output $y_{target}(n)$). If RMSE is divided by variance of y_{target} Normalized RMSE (NRMSE) is obtained.

Trainable weight W_{out} if determined by minimizing RMSE.

3. THE APPLICATION OF ESNS FOR THE PREDICTION OF STOCK PRICES

As stated, ESN is quite novel algorithm for time series prediction and only few researches have been published for estimation of financial data set. Table 1 represents review of the related researches.



Table 1. Review of researches related to the application of ESNs for the prediction of financial data state

Research	Method	Period of analysis	Financial data set	Results
Ilies et.al, 2007	ESN	18 months	Unknown source	ESN must be optimized for each application;
Fangwen et.al, 2010	ESN	05/16/03-10/01/07;	the daily prices of securities (opening, the highest, the lowest, closing) incorporated in six major stock indexes in the world DJIA, S&P 500, NASDAQ, HSI, FTSE 100 and NIKKEI 225;	ESN achieves smallest prediction error
Bernal et.al, 2014	ESN	Late 2004-early 2009;	the prediction of S&P 500 index;	the proposed architecture showed good accuracy
Liu et.al, 2017	ESN	04/01/00-01/21/16;	Daily prices of securities of Shanghai Composite index (opening, the highest, the lowest, closing) and especially created the ratio of the average closure in the previous 5 or 10 days;	Provides more reliable prediction of securities' pricing;
Liu et.al, 2018	ESN (first optimized on task-independent test)	Period is not stated	the dataset from Shanghai stock market (with 4,579 sets);	the proposed model achieves a better prediction accuracy;
Taehwan and King, 2020	Deep ESN - instead of one, 6 reservoir are used in serial configuration	14/08/1999 - 01/08/2019;	S&P 500 index	Slightly better than standard ESN, but much more complicated and slower to train.

Source: Authors' created on the basis of available researches

Ilies et.al (2007) investigated the possibility of ESN usage for predicting of financial data. As dataset of 118 time series from 18 months period is used from unknown source (it was part of competition). They showed that depending on data, for the best results the size of reservoir varies between 45 and 110 nodes, indicating than ESN must be optimized for each application.

Fangwen et.al (2010) presented a study of using an ESN to estimate the next value in financial time series. Authors chosen to use daily prices of securities incorporated in six major stock indexes in the world DJIA, S&P 500, NASDAQ, HSI, FTSE 100 and NIKKEI 225. Firstly, they proved that selected time series manifest predictable behaviour using Hurst exponent. They extracted several parameters like Row Stochastic Value (reflects price changes in short-term), K line (indicates strength or weakness on the market in the future period of time), MTM parameters (shows how quickly is respond to change) and Volume's Rate of Change (measure of investors' emotional state in short-term period). Secondly, they investigated whether it was possible to reduce number of features using PCA (Principle Component Analysis). Moreover, they trained ESN using financial data of 1100 days long stock indices

set and then compared ESN with two other NN algorithms (Elman network and backpropagation network). Finally, they found that ESN achieves the smallest prediction error.

Bernar et.al (2012) used ESN for prediction of S&P 500 index (based on 500 biggest companies in the United States of America). ESN had $N = 100$ nodes with $\alpha = 0.8$ and used 5 day history to predict next day value. The proposed architecture showed good accuracy, better than moving average (next value is predicted as average from resent ones) and Kalman filter (standard algorithm in control theory commonly used for prediction true value from sensors).

Lui et al (2017) proposed a way how to improve the performance of ESN averaging prediction results from 18 ESNs using voting (weighing each result by estimated accuracy of each ESN). They got 4% increase in accuracy using this method over standard ESN. As dataset they used values of Shanghai Composite Index for 16 years.

Liu et.al (2018) suggested optimisation of using of improved fruit fly optimization algorithm (IFOA). IFOA is basically an iterative search through the parameters with the goal to find optimal ones for specific tast.



Basically, parameters space of ESN was searched to find the optimal ones. That optimized ESN is then used to predict financial time series. The data set comes from Shanghai stock market and it has 4,579 sets where 80% is used for training and 20% is used for testing. The experiment is a one-step prediction, where six financial indicators (i.e. opening, the highest, the lowest and closing price of securities subject of trade, daily trading volume, and daily turnover of securities subject of trade) are used as input features, and the opening price (of securities subject of trade) on the next day is the output. Compared to the backpropagation (BP), Elman neural networks and standard ESN, the proposed model achieves a better prediction accuracy.

Taehwan and King (2020) research is the most recent research about using ESN in predictions of financial data set i.e. prices of securities and volumes of trade. S&P 500 index was used as dataset. Using paradigm from deep neural network, authors suggested applying 6 reservoirs in a row. Output from the current reservoir is input for the next one, except for the first reservoir, where the input is the input of network. The final output of the network is linear combination of outputs from all six reservoirs and only those weights are trainable. This deep ESN manifested smaller error than gated recurrent unit (GRU) neural network, LSTM (Long short-term memory) and standard (one reservoir) ESN, but with longer training time.

4. CONCLUSION

Although there is only a few studies about using ESN for predicting financial data (pricing of securities subject of trade, and their volumes), it can be concluded that ESNs have great potential to be used in prediction of the stock prices, due to the fact that they can foresight future value of time series well, when the underlying mechanism demonstrates chaotic behaviour. Additional ESN is easy and fast to train, so it can be implemented in photonic circuit which guarantees instant inference with negligible power dissipation and this is crucial for analysing big amount of data like in economics, where not only trading with securities, but also in enterprise risk management (especially in the fraud risk management, credit risk management – early warning system, operational risk management – business continuity and disaster recovery plan, market risk management, liquidity risk management, etc.).

For future work, optimisation of ESN parameters could be considered, such as finding number of N nodes, leaking rate α and length p of input sequence. This parameters should be adjusted for each task, like to predict prices of securities and volume of trading on Belgrade Stock Exchange (BELEX). Additionally, the usage of other activation functions like sinus function might be researched due to

fact that it recently showed drastically faster training of deep NNs (Stizmann et.al, 2020). Finally, recent efforts of using deep ESNs should be also investigated in more details.

5. ACKNOWLEDGMENT

This paper is: a) part of the project COST CA19130 - Fintech and Artificial Intelligence in Finance - Towards a Transparent Financial Industry; b) supported by the Ministry of Science and Technological Development of the Republic of Serbia.

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DOES PROFITABILITY REFLECT COMPANY'S FINANCIAL HEALTH IN THE REPUBLIC OF SERBIA?

Vladimir Mirković^{1*},
Marija Vujičić¹,
Dragana Andonović Brmalj²

¹Economists Association of Belgrade,
Belgrade, Serbia

²Third Basic Court,
Belgrade, Serbia

Abstract:

By using quantitative models, it is possible to take insight into real financial strength and creditworthiness of companies. The aim of this paper is to determine if relationship between profitability and financial "health" of companies could be explained through implementation of Kralicek's DF model. The main research question in the paper is defined as follows: are the best performances according to Kralicek's test based on adequate and sustainable proportion of accompanied financial ratios? Authors concluded that the company "HIP Petrohemija" was the best performer among analyzed sample and consequently that company was the subject of comprehensive analysis, using well-known quantitative models such as: Beneish M-score and Altman Z-score. At the end of in-depth analysis, authors unexpectedly identified that profitability of the company "HIP Petrohemija" is direct consequence of government's intervention and conversion of company's debt into the equity. Nevertheless, this conclusion does not diminish the role and value of applied quantitative models in the process of financial health evaluation.

Keywords:

financial health, quantitative models, ratio analysis, creditworthiness, Republic of Serbia.

1. INTRODUCTION

Financial statements are the key source for the evaluation of company's creditworthiness. Based on annual financial reports, all stakeholders could take insight into company's financial status and could analyze the key performance indicators. There are various models, based on prediction of early warning signals, which could point out the existence of distress in the company's business.

Initial works are related to studies of Beaver (1966) and Altman (1968). This early phase of creditworthiness evaluation based on business indicators led to evolution of contemporary models. Among modern contributions, the most quoted are those from Scott (1981), who stated that financial distress not necessarily leads to bankruptcy and permanent insolvency, while Pastena and Ruland (1986) point out other possibilities for companies in financial distress, such as: business continuity followed by realistic expectations of future solvency and merger activities.

Aligned on Altman's Z-score model, during 1990s, Austrian Professor Peter Kralicek developed the so-called Kralicek's DF indicator (DF abbreviated from: discriminatory function), based on the sample of European companies on the markets in Austria, Germany and Switzerland (Kralicek, 2007; Mizdraković et al, 2015). Relying on official financial statements, Professor Kralicek carried out a multivariate discriminatory analysis, which resulted in formation of business model for bankruptcy prediction (Zenzerović, & Peruško, 2006).

The aim of this paper is to determine if implementation of Kralicek's DF model could explain relationship between profitability and financial "health" of companies.

Correspondence:
Vladimir Mirković

e-mail:
vladamirkovic@orion.rs



2. DATA AND METHODOLOGY

The purpose of the analysis is to isolate the company with the best performances in terms of profitability and indicators according to Kralicek’s DF model. Then, the advancer in the observed sample was the subject of detailed analysis, using well-known quantitative models, such as: Beneish M-score and Altman Z-score. By using Beneish M-score, the authors focused on identifying whether financial statements of the advancer were misrepresented, which led to wrong impression about real earning ability of the company. Later, Altman Z-score model was implemented in order to complete analysis and provide an answer to the question: what is the likelihood of company’s bankruptcy?

Starting point in this research was identification of 20 companies with the largest net profit after tax reached at the end of 2017, according to the available financial statements published on the official website of Serbian Business Registry. Beside official financial statements, the authors used valid chart of accounts for mapping the positions that are included in calculation of financial indicators embedded into Kralicek’s model. Companies from the sample were subject of analysis through Kralicek’s quick test and DF model, which required calculation of several indicators. The structure of the sample is presented in Table 1.

Table 1. Top 20 Serbian companies in terms of net profit in 2017

Legal entity short name	Net profit after tax in 2017 (in 000 RSD)
1. HIP Petrohemija	40,455,606
2. NIS	27,790,460
3. Srbijagas	16,723,376
4. Telekom Srbija	14,548,188
5. Tigar Tyres	10,311,332
6. Telenor	9,000,153
7. Galenika	6,463,456
8. Beogradske Elektrane	5,387,558
9. Delhaize Serbia	4,264,433
10. Sunoko	4,047,623
11. Imlek	4,041,958
12. Philip Morris	3,840,206
13. Tetra Pak	3,832,188
14. Železnice Srbije	3,587,217
15. Coca-Cola HBC Srbija	3,471,770
16. Elektroprivreda Srbije	3,396,385
17. Aerodrom Nikola Tesla	3,265,674
18. Jugoimport-SDPR	3,133,648
19. Invej	3,125,134
20. Elektromreža Srbije	3,024,346

Source: Serbian Business Registry (2018)

Quick test gives a company’s “snapshot” based on four key indicators, which are grouped into two broad categories: the first two indicators (i.e. self-financing coefficient and debt repayment period in years) determine financial

stability, while the other two indicators (i.e. total capital viability percentage and cash flow in business income) determine profitability (Polo&Caca, 2014). Those four indicators are calculated in the following way:



$$\text{Self-financing coefficient (K}_1\text{)} = \frac{\text{capital}}{\text{total liabilities}} \quad (1)$$

$$\text{Debt repayment period in years (K}_2\text{)} = \frac{\text{total liabilities - cash}}{\text{net profit + depreciation}} \quad (2)$$

$$\text{Total capital viability percentage (K}_3\text{)} = \frac{\text{EBIT}}{\text{total assets}} \quad (3)$$

$$\text{Cash flow in business income (K}_4\text{)} = \frac{\text{net profit + depreciation}}{\text{operating income}} \quad (4)$$

EBIT (Earnings Before Interest and Taxes) in K_3 indicator is calculated as the sum of net profit before interest and taxes and interest expenses. After calculation methods of four business indicators, the authors assigned grades in range from 1 (excellent grade) to 5 (worst grade, which reflects insolvency risk), as per defined criterion in Kralicek (2007). Kralicek's DF indicator is represented with next equation (Kralicek, 2007):

$$DF = 1.5X_1 + 0.08X_2 + 10X_3 + 5X_4 + 0.3X_5 + 0.1X_6 \quad (5)$$

where:

$$X_1 = \frac{\text{EBIT + depreciation}}{\text{total liabilities}} \quad (6)$$

$$X_2 = \frac{\text{total assets}}{\text{total liabilities}} \quad (7)$$

$$X_3 = \frac{\text{net profit before tax}}{\text{total assets}} \quad (8)$$

$$X_4 = \frac{\text{net profit before tax}}{\text{total revenues}} \quad (9)$$

$$X_5 = \frac{\text{inventories}}{\text{total revenues}} \quad (10)$$

$$X_6 = \frac{\text{operating income}}{\text{total assets}} \quad (11)$$

According to the obtained values of DF indicator, the authors carried out the evaluation of financial strength using defined thresholds presented in Table 2.

Table 2. Kralicek's DF indicator – values and grades

DF value indicator	Financial stability
> 3	Excellent
> 2.2	Very good
> 1.5	Good
> 1	Medium
> 0.3	Bad
≤ 0.3	Beginning of insolvency
≤ 0	Moderate insolvency
≤ -1	Strong insolvency

Source: Kralicek (2007)

3. RESEARCH RESULTS

The authors conducted quick test based on company's financial statements at the end of 2017 and compared the achieved results with relevant quick test results based on data in 2016 and 2015 (presented in Table 3).

Table 3. Kralicek's Quick test results on sample

Legal entity short name	Size	2017	2016	2015
1. HIP Petrohemija	large	1.00	3.50	3.50
2. NIS	large	1.75	2.00	2.25
3. Srbijagas	large	2.50	3.50	3.50
4. Telekom Srbija	large	1.50	1.50	1.50
5. Tigar Tyres	large	1.00	1.75	1.25
6. Telenor	large	1.00	1.00	1.00
7. Galenika	large	1.75	3.50	3.25
8. Beogradske Elektrane	large	1.50	1.00	1.75
9. Delhaize Serbia	large	1.75	1.75	1.75
10. Sunoko	large	1.50	1.00	1.50
11. Imlek	large	2.75	2.00	2.25
12. Philip Morris	large	1.00	1.00	1.75
13. Tetra Pak	large	1.00	1.00	1.00
14. Železnice Srbije	middle	2.50	2.75	4.25



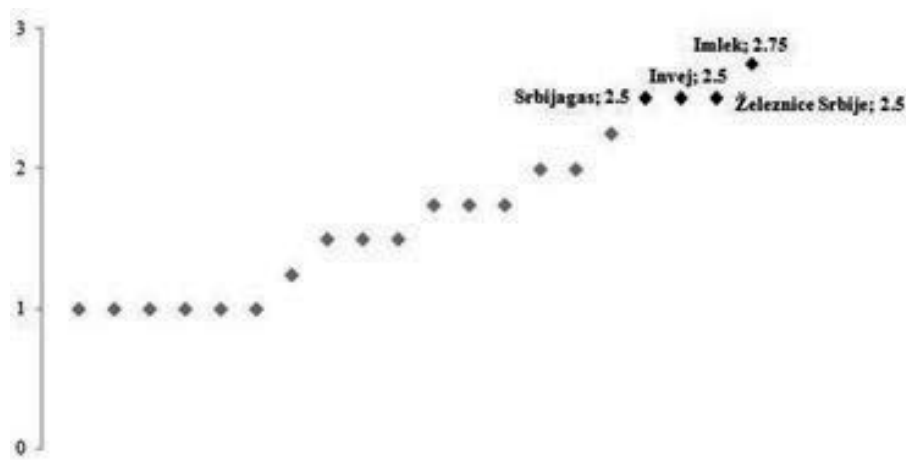
15. Coca-Cola HBC Srbija	large	1.00	1.00	1.00
16. Elektroprivreda Srbije	large	2.25	2.00	2.25
17. Aerodrom Nikola Tesla	large	1.25	1.25	1.00
18. Jugimport-SDPR	large	2.00	1.50	2.00
19. Invej	small	2.50	4.00	2.25
20. Elektromreža Srbije	large	2.00	2.25	2.75

Source: Authors' calculation

Results in Table 3 showed that in 2017 joint stock company “Imlek” had the worst performance (with 2.75), followed by three companies with average grade 2.50, namely: “Železnice Srbije”, “Srbijagas” and “Invej”. The prevailing size of organizations in the sample were large companies (90% of them), while small and middle-sized companies participated with 5% in the observed sample. According to the quick test, average grade for large companies was 1.58, while small and middle companies had an equal grade of 2.50.

Considering the legal form of companies, the structure of sample is following: ten companies are organized as joint stock companies, six companies are organized as limited liability companies and four companies are public entities. The best average grade in terms of Kralicek’s quick test, observing only legal form of organizations, has the segment of limited liability companies (1.21), followed by the segment of joint stock companies (1.80), while public companies segment has the worst performance (2.06). The worst performers, independent on their legal form, are presented in Figure 1 with black colored marks.

Figure 1. Quick test results in 2017



Source: Authors' calculations

The next stage in analysis is related to the implementation of Kralicek’s DF indicator, based on equation (5), on the observed sample of companies and comparing results

in three consecutive years, for period from 2015 to 2017 (presented in Table 4).



Table 4. Kralicek's DF indicator on observed sample

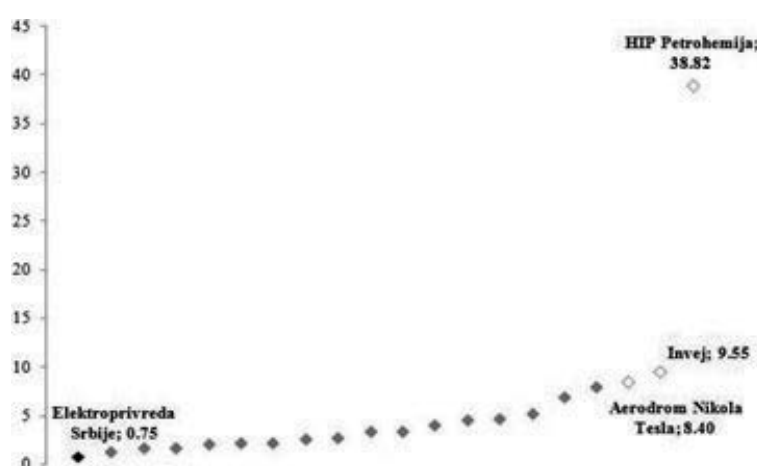
Legal entity short name	Size	DF Indicator 2017	DF Indicator 2016	DF Indicator 2015
1. HIP Petrohemija	Large	38.82	0.10	0.12
2. NIS	Large	2.36	1.50	1.54
3. Srbijagas	Large	2.42	0.45	0.52
4. Telekom Srbija	Large	2.83	2.81	2.64
5. Tigar Tyres	Large	3.51	2.68	3.29
6. Telenor	Large	5.36	5.19	4.92
7. Galenika	Large	7.01	0.20	0.24
8. Beogradske Elektrane	Large	2.78	4.56	2.07
9. Delhaize Serbia	Large	1.51	0.84	1.24
10. Sunoko	Large	3.54	4.06	3.26
11. Imlek	Large	1.84	1.25	0.53
12. Philip Morris	Large	4.75	2.77	1.97
13. Tetra Pak	Large	8.05	6.10	8.04
14. Železnice Srbije	Middle	4.91	2.56	0.05
15. Coca-Cola HBC Srbija	Large	4.15	4.25	3.35
16. Elektroprivreda Srbije	Large	0.75	1.10	1.09
17. Aerodrom Nikola Tesla	Large	8.40	6.67	7.10
18. Jugimport-SDPR	Large	2.25	2.77	1.86
19. Invej	Small	9.55	0.13	4.27
20. Elektromreža Srbije	Large	1.85	1.13	1.56

Source: Authors' calculation

Figure 2 presents results of Kralicek's DF indicator in 2017 for observed sample. Public company "Elektroprivreda Srbije" had the worst performances with indicator 0.75 (black colored mark on Figure 2).

On the other hand, the best performer in the observed sample of companies was joint stock company "HIP Petrohemija" with average grade 38.82 (white colored mark in upper right corner on Figure 2).

Figure 2. Kralicek's DF indicator results in 2017



Source: Authors' calculations



Additional verification of obtained results is conducted via IBM software Statistical Package for the Social Sciences, known as SPSS. Pearson's r coefficient between net profit after tax and Quick test results (-0.207) show that there is a weak inverse correlation between those two variables, confirming the previous assumption that companies with higher net profitability tend to have lower Quick test result. Similarly, Pearson's r coefficient between net profit after

tax and DF indicator values (0.683) show that there is a strong positive correlation between those two variables, justifying the assumption that companies with higher net profitability tend to have higher values of DF indicator. The described relationships between variables are presented in Table 5, as well as in Figure 3 and Figure 4 with scatter plot diagrams.

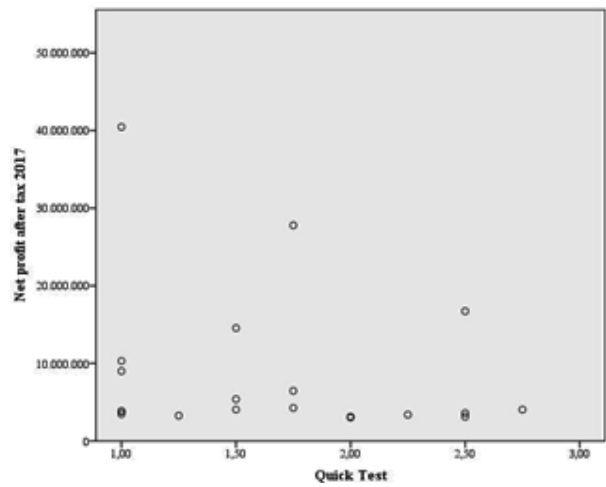
Table 5. Pearson's correlation coefficient (N=20)

	Net profit after tax 2017	Quick test	DF indicator
Pearson Correlation	1	-0.207	0.683**
Significance (2-tailed)		0.38	0.001

**Correlation is significant at the 0.01 level (2-tailed)

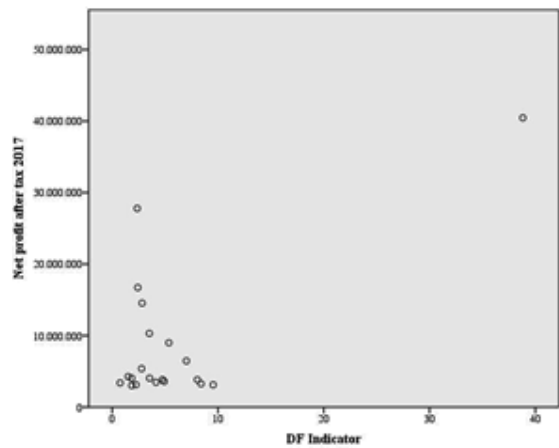
Source: Authors' calculation

Figure 3. Scatter plot diagram between net profit and Quick test



Source: Authors' calculations based on SPSS

Figure 4. Scatter plot diagram between net profit and DF indicator



Source: Authors' calculations based on SPSS



Undoubtedly, the results of Kralicek's DF indicator point out the conclusion that company "HIP Petrohemija" is the main advancer in the sample of 20 companies, initially created by criterion of net profitability. Also, it is obvious that the company "HIP Petrohemija" has the largest differences in final grades according to DF indicator: from 0.12 and 0.10 in 2015 and 2016 respectively, to 38.82 in 2017. The above mentioned results which separate the company "HIP Petrohemija" as the advancer, impose the necessity for detailed analysis, using well-known quantitative models, such as: Beneish M-score and Altman Z-score.

4. APPLICATION OF BENEISH M-SCORE MODEL

Professor Messod Beneish introduced multivariate models for the recognition of manipulations in financial statements. Those models are known as Beneish M-score model with five and eight variables, depending on the number of variables that are included in model.

The example of company listed on stock exchange in emerging countries which is exposed to testing and implementation of Beneish M-score model is represented in the paper of Mirković (2014). Mirković concluded that apart from the proscribed liability for joint stock companies to operate transparently and the fact that some of them are among very liquid on Belgrade Stock Exchange, there is a high probability that they potentially misrepresent financial statements. In this paper, the authors implemented the Beneish M-score model for the company "HIP Petrohemija", which is marked as the best performer after the implementation of Kralicek's DF indicator (presented in Table 6) and compared results with defined thresholds for Beneish model. Thresholds are set at minus 2.2 (for Beneish M-score with five variables) and minus 1.78 (for Beneish M-score with eight variables).

Table 6. Beneish M-score model for "HIP Petrohemija"

Indicator	2017
DSRI (Days' sales in receivable index)	1.20
GMI (Gross margin index)	1.00
AQI (Asset quality index)	0.00
SGI (Sales growth index)	2.04
DEPI (Depreciation index)	1.08
SGAI (Sales and general and administrative expenses index)	1.19
TATA (Total accruals to total assets)	0.52
LVGI (Leverage index)	0.03
M-SCORE (with 5 variables)	-2.60
M-SCORE (with 8 variables)	0.94

Source: Authors' calculation

Limitation in the model for the company "HIP Petrohemija" is reflected into the fact that zero value is assigned for one variable (asset quality index), due to non-existence of the balance on financial position "Intangible assets". In respect of the mentioned limitation, the obtained result for Beneish M-score with five variables at minus 2.60 shows that there are no visible drivers that the company "HIP Petrohemija" could be observed as a manipulator. On the other side, result for Beneish M-score with eight variables at 0.94 (both presented in Table 6) show that there is a very high likelihood for financial statements misrepresentation in case of the company "HIP Petrohemija". That conclusion leads to the necessity for complementary analysis using Altman Z-score.

5. APPLICATION OF ALTMAN Z-SCORE MODEL

As it is prescribed with original Altman Z-scoring model (Mirković, 2013), the purpose of the model is to evaluate the probability of bankruptcy according to defined variables. Results for original and adjusted Altman Z-scoring applied in the case of the company "HIP Petrohemija" for 2016 and 2017 are showed in Table 7.



Table 7. Original and adjusted Altman Z-score model for “HIP Petrohemija”

Indicator	2017	2016
$T_1 = \text{Net working capital} / \text{Total assets}$	0.55	-2.30
$T_2 = \text{Retained earnings} / \text{Total assets}$	0.13	0.00
$T_3 = \text{EBIT} / \text{Total assets}$	0.18	0.30
$T_4 = \text{Book value of equity} / \text{Total liabilities}$	7.96	0.00
$T_5 = \text{Operational income} / \text{Total assets}$	1.36	1.60
Original Z-SCORE	7.58	-0.18
Adjusted Z-SCORE	16.86	-9.86

Source: Authors' calculation

As per Altman Z-score, companies with Z score above 3 are considered as successful and “healthy”, the analyzed company “HIP Petrohemija” in 2017 achieved Z-score significantly above the proscribed threshold. This means that business operations of the company are not exposed to risk considering key indicators covered by Altman Z-score model. The largest contribution to reached Z-score in 2017 has indicator T₄ (equals 7.96), which is the result of increasing the capital level which stood at 2.4 billion RSD in 2017 (Serbian Business Registry, 2018).

By analyzing audit report for 2017, it could be concluded that the bankruptcy proceeding under the company “HIP Petrohemija” was initiated in August 2017, after the adoption of reorganization plan. By government involvement and debt conversion into the capital through a new issue of shares, “HIP Petrohemija” was artificially enabled to reach positive net result of 40.46 billion RSD in 2017. Government intervention in the case of “HIP Petrohemija” is clearly justified in the ownership structure of the company. Namely, among five largest shareholders are state-owned entities or entities which are closely connected to the state, such as: “Srbijagas” - 32.2% of shares, “Republic of Serbia” - 30% of shares, “NIS” - 20.9% of shares, “Elektroprivreda Srbije” - 4.9% of shares and “Development Fund Republic of Serbia” - 4.4% of shares (Central securities depository and clearing house, 2018). Moreover, according to the information from the company “HIP Petrohemija” website “The creditors have converted 52.3 % of total claims, while 47.7% have been written-off, so the issue of the old debts has been solved. After the adoption and implementation of reorganization plan, the Republic of Serbia and connected entities own about 76% of shares, while “NIS” and “Lukoil” possess the remaining 24% of shares” (HIP Petrohemija, 2017).

Due to specific characteristics of emerging markets in comparison to developed economies, original Altman Z-score is adjusted for the purpose of reflecting the differences among markets. The adjusted Z-score for emerging economies should be calculated as follows:

$$Z = 3.25 + 6.56T_1 + 3.26T_2 + 6.72T_3 + 1.05T_4 \quad (12)$$

In the above mentioned formula, four variables which are used are the same as it was already described via original Z-score (Table 7), while the fifth variable from the original Z-score model is omitted due to Altman’s observation that variable T₅ showed the largest deviation for certain industries (Vlaović Begović et al., 2014). The achieved values of Z-score for emerging markets are interpreted in the following manner:

1. Z-score higher than 2.60 means that the company is in “safe” zone;
2. Z-score between 1.10 and 2.60 means that the company is in “grey” zone;
3. Z-score at the level lower than 1.10: the company is in “distress” zone.

Analyzing the company “HIP Petrohemija” authors founded that the adjusted Z-score (calculated and presented in Table 8) in 2017 outperformed the original Z-score, contributing to the conclusion that relation between observed ratios could be assessed as favourable. Also, this conclusion should be complemented with the fact that government intervened in the case of the company “HIP Petrohemija” in order to save the company from bankruptcy. It was clearly recorded in official audit report for 2017 and the results of Altman Z-score in 2016 (both original and adjusted), when all relevant parameters signaled that bankruptcy of the company “HIP Petrohemija” was inevitable.



6. CONCLUSION

As the fourth industrial revolution is focused on the automation of traditional industrial practices, the financial industry will also change its form in many aspects. In that sense, the area which should be more or less modified in the future is the usage of quantitative models in more sophisticated manner. This paper highlights the usage of quantitative models for the identification of company's real financial strength. The authors assessed the financial health of 20 companies which reached the largest net profit after tax in 2017, by using Kralicek's Quick test and DF indicator. After the evaluation by Kralicek's models, the authors chose the company with the best performances and exposed it to the rigorous and "in-depth" analysis via Altman Z-score and Beneish M-score models. Kralicek's Quick test and DF indicator showed that the best performances were related to joint stock company "HIP Petrohemija". Simultaneously, that company was the company with the highest net profit after tax recorded in 2017.

In the second phase, the authors made detailed analysis regarding financial strength of the company "HIP Petrohemija", using Altman Z-score and Beneish M-score models. Despite the fact that company "HIP Petrohemija" has recorded the highest net profit after tax in 2017, it is clear that reached net profit is the result of government intervention and conversion of company's debt into the equity. Reorganization plan implemented in consolidation process of the company "HIP Petrohemija" with high involvement of the Serbian Government was the major driver of the highest net profit after tax in 2017. The case of the company "HIP Petrohemija" is very specific, where the state as the largest individual shareholder used its discretion right to convert debt into equity and prevent further loss generation in this joint-stock company.

In the context of paper title, the authors found that profitability should be considered as one of important determinants for the evaluation of company's financial health. But at the same time, analysts should take into account all other aspects which are hidden behind the reached profitability, meaning that the achieved net profit does not necessarily rely on operating performances of the company.

The above mentioned does not diminish the role of quantitative models in the economic theory and practice. On the contrary, quantitative models are very useful and should be used as basic as well as additional tool for comprehensive analysis and evaluation of company's financial health.

Also, quantitative models are very important from the aspect of automation process in creditworthiness evaluation in the future and they should be treated as the area which needs continuous upgrade as a part of lifelong learning concept.

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THE IMPLEMENTATION OF FUZZY SETS IN DECISION MAKING PROCESS

Snežana Konjikušić^{1*},
Gordana Radojević²,
Ana Vjetrov¹

¹FEFA,
Belgrade, Serbia

²Direktna banka,
Belgrade, Serbia

Abstract:

The focus of this paper is the system for supporting financial decision-making as well as the possibility of its upgrading in order to get close to the conditions that apply and exist within real business environment. In this paper, the problems of defining the relevant criteria will be considered, as well as the presentation and implementation of an adequate model for evaluating the company that appears as the loan applicant. Within the paper, the model for financial decision support is defined, based on fuzzy logic and applicable within banking sector. Therefore, the aim of this paper is to improve financial decision-making process in the banks by applying the concepts and models related to decision support systems, with the strong focus on decision-making support systems based on knowledge and intelligent decision support systems.

Keywords:

fuzzy model, decision problems, finances.

1. INTRODUCTION

Making financial decisions represents one of the most common problems in current financial management. One of the most important things within process of making financial decision is related to credit decisions. Both importance and complexity of this issue represent the main logic why so many efforts in the previous years have been made in order to formulate the methods that would tackle this problem most realistically. The need for applying suitable and efficient methods and procedures is confirmed, bearing in mind that the underlying problem is very complex and therefore difficult to apply to the confining hypotheses on which mathematical models are often build. Various models based on decision support systems are frequently used for solving similar problems.

Today, financial decision support is very interesting topic for various surveys, both in theoretical and practical sense. In modern banking, financial decision-making based on financial analysis plays very important role. Intensive research in the past, regarding the issue of financial decision-making, has led to the introduction of various methods that are used as systems to support the process of making financial decisions (Dalalah et.al, 2011). These systems are based on various mathematical methods and they are being effectively implemented in everyday banking practice.

The issue related to making financial decision was first clarified by classical methods of multi-criteria decision-making. This approach has the advantage in the sense that it is clearly mathematically described, but its disadvantage is the fact that connection with the real life activities is missing.

Further changes regarding classical model were made in various directions (Altrock, 1996).

Correspondence:
Snežana Konjikušić

e-mail:
skonjikusic@fefa.edu.rs



All these changes were made with the same goal and it was to bring the models closer to the real life situation with respect to the real conditions and limitations. Criteria for making a financial decision can be expressed quantitatively and qualitatively, taking into account the subjectivity of the decision-maker i.e. - the criteria sometimes involve subjective attitudes or personal preferences (Brotons & Terceno, 2011). Thus, these values are sometimes characterized by inaccuracy and uncertainty. The common limitation of classical models relates to the fact that sometimes criterion values are understood rigidly, i.e. two alternatives (credit requirements) will be acknowledged the same by some criterion only if the values of that criterion are identical, and if there is slight variation in value, one alternative will be seen more suitable, which does not coincide with reality where preferences are not always that rigid (Zimmerman, 2001). All this has led to a slight change related to the ways of observing the modelling of the problem of making financial decision.

By applying the fuzzy logic related to decision support systems, intelligent decision support systems are gained, representing a step forward in decision theory (Klir & Folger, 1998). The models obtained in this way can be successfully implemented in the process of financial decision-making, since they are more consistent with the real life activities. By designing and implementing such a realistic model, a powerful tool is gained whose role is to help the decision maker to achieve his goal that relates to making a valid financial decision.

2. FUZZY EXPERT SYSTEM

The analysis related to model of making financial decision, where financial analysis is used, emphasizes an area that can be advanced by suggesting fuzzy concepts, which involves qualitative assessment procedures. The value of qualitative indicators represents linguistic expressions and they can be presented by fuzzy sets. The main rationale for implementing the fuzzy concepts is the fact that they are appropriate for presenting linguistic values and translating them into real, quantitative values.

By introducing membership functions for each parameter, showing the cognitive state of things, a more flexible and realistic knowledge representation system is obtained (Hadavandi et.al, 2010). The fuzzy approach enables the manipulation of expert knowledge at a high level of abstraction in the form of linguistic variables. This feature is very important for the success of the functioning of entire expert system and represents a novelty in comparison to classical expert systems. Expert knowledge in the fuzzy expert system is presented in the form of rules expressed by linguistic variables, which is very real and close to the man-expert and his way of reasoning.

The fuzzy concept enables expert knowledge to be presented in a computer system at a high level of abstraction; in the shape of if/then rules with linguistic indicators in the way the expert himself recognizes them (Yu et.al, 2009).

3. FUZZY DECISION- MAKING MODEL

The developed fuzzy model related to making financial decision is used for the qualitative evaluation of the company. The fuzzy model related to making financial decision was implemented using the MatLab software package (Sivanandam, et.al, 2007). Within MatLab software, fuzzy toolbox was used in order to solve decision-making problems. Fuzzy model related to financial decision-making process includes: defining the key parameters related to the model (number of output and input variables, defining the basic logical operations); defining a set of attributes for every input and output variable; defining a set of rules for calculating the value of an output variable; interpretation of the obtained results.

Table 1 shows the qualitative indicators of the company (input variables of the model) and the qualitative score (output variable) as well as the associated attributes, and the value of input variables which is determined by the decision - maker who assigns a rating from the interval $[0, 1]$ to each of the qualitative indicators (Barjaktarović et.al, 2017). A set of attributes is defined for all qualitative linguistic variables. A larger or smaller number of attributes can be used, but in this paper three attributes are used as the optimal number for an efficient presentation of this model. Every attribute is described by a single fuzzy set. In this paper, trapezoidal shapes are used for fuzzy sets i.e. attributes (Radojević & Konjikušić, 2004). The presented variables will be the basis for the fuzzy model used for determining of the qualitative score of the company.



Table 1. Input variables, attributes and weight factors:

Input variables, attributes and weight factors:		
Variables	Attributes	Weight factors
Competition analysis	Uncompetitive Equally competitive More competitive	0.2
Company's reliance on the customer	High Average Weak	0.1
Company's reliance on the supplier	High Average Weak	0.1
Market size	Decreasing Stable Increasing	0.3
Accounting quality	Poor quality Average Good	0.1
Continuity of doing business	Not provided Provided	0.2
Output variable		
Qualitative score	Dissatisfactory Relatively satisfactory Satisfactory	

Source: Authors' calculation

Within the process related to the fuzzy model implementation, the following components are defined: input and output indicators (variables), logical operations that will be applied within the process of making financial-decision

and the method of defuzzification. Figure 1 shows the screen from MatLab, where specified model parameters are being defined.

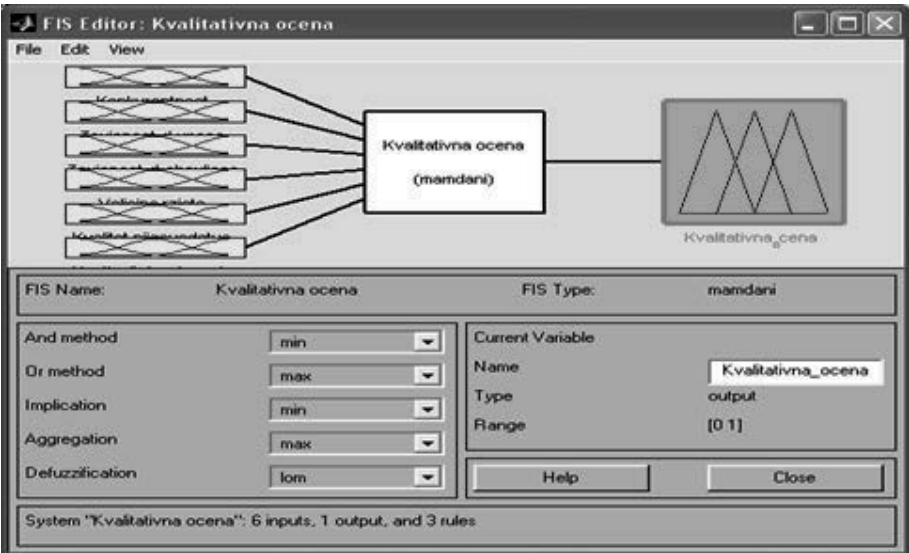


Figure 1. Basic model parameters

Figure 2 represents a screen from MatLab showing the definition of one of the six input variables, and other

model variables are defined in a similar way. Figure 3 presents the definition of output variable.

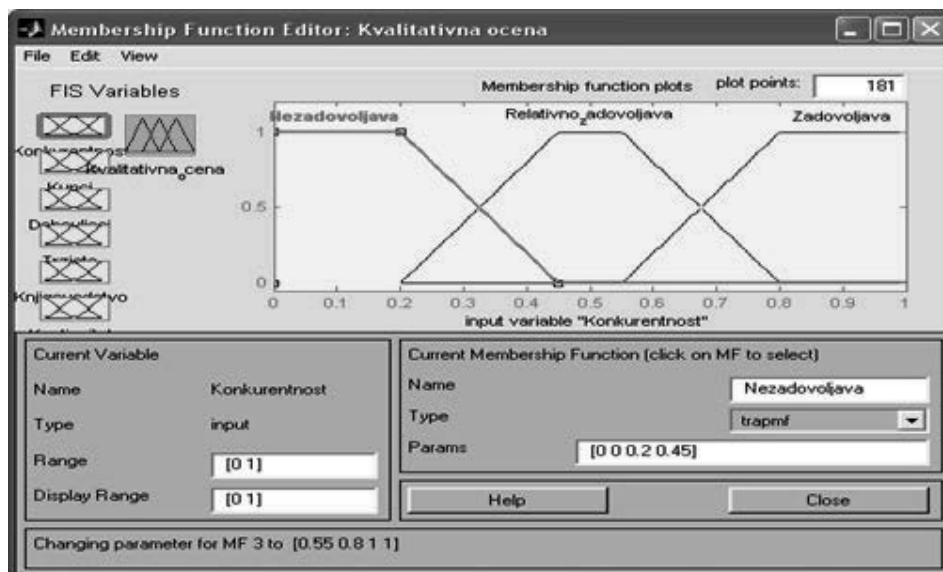


Figure 2. Definition of input variable Competitiveness assessment

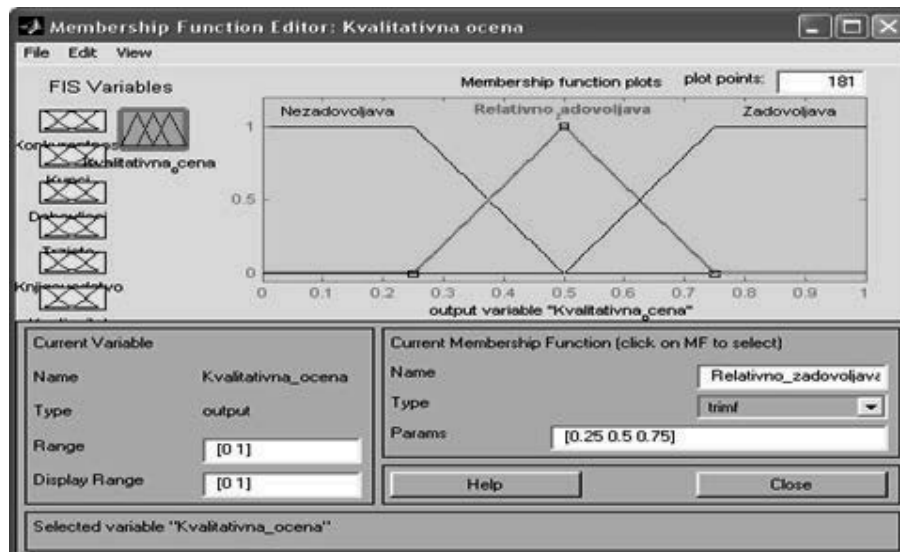


Figure 3. Definition of output variable

The following reasoning rules are defined for calculating the qualitative score of the company:

- When the value related to all input variables is Unsatisfactory then the value related to the output variable is Unsatisfactory
- When the value of at least one of the input indicators (variables) is different from Unsatisfactory then the value related to the output variable is Relatively satisfactory
- When the value related to all input indicators (variables) is Satisfying, then the value related to the output variable is Satisfying.

These rules can be defined in a different way, depending on the both needs and preferences related to the decision-maker. Finally, Figure 4 shows the rule viewer screen related to the values of the input indicators (variables) presented in Table 1. The qualitative score is 0.34.

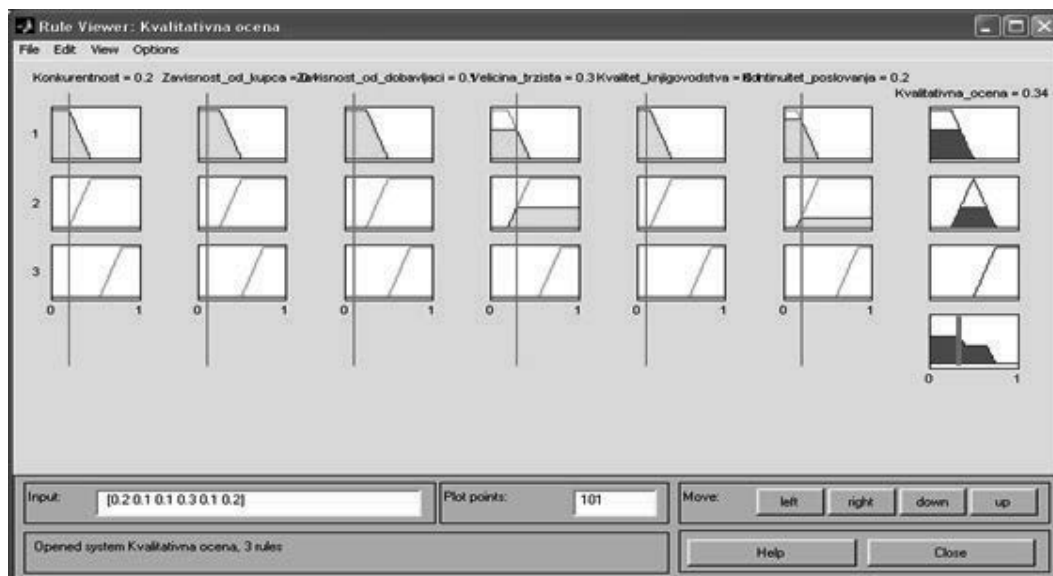


Figure 4. The qualitative score for the values (0.2, 0.1, 0.1, 0.3, 0.1, 0.2)

Within the process of making decision, as an output outcome, the output fuzzy variable was obtained, which is described by a set of related attributes, i.e. linguistic variables. Every attribute is described by a single fuzzy set (Cross & Sudkamp, 2002). The defined fuzzy model related to decision-making as an output gives the fuzzy set and defuzzified score, i.e. the model also gives us the value related to the output variable in a discrete form, i.e. number. In this model, defuzzification was done by using the lom method (largest of maximum)

The Rule viewer shows a score as a fuzzy set and a defuzzified score. By analyzing the values of qualitative indicators shown in Table 1, it can be said that the qualitative score of the company is satisfactory, reaching the level of 0.34. It should be considered that the obtained score has range from 0 to 1. As the final decision related to the accepting of the obtained score can be made by comparing the obtained results with a predefined reference value, for instance, the score can be considered acceptable when it is higher than 0.8 if a more rigorous approach is being implemented, or if it is higher than 0.3 if there is a more flexible approach being implemented. The qualitative score obtained within this process does not represent the final score of the company's performance, upon which credit decision should be made (Yalçın et.al, 2009). The qualitative analysis represents one of several partial evaluations of the company's performance that will jointly form the final score of the company's performance, upon which the lending decision will be made.

4. CONCLUSION

Support systems related to decision making, as well as decision support systems that are knowledge-based and intelligent decision support systems, represent a very important field of scientific research that has found its application within a large number of areas of human activity. Further, these systems are intensively being implemented in financial decision-making process. This paper systematizes the lessons learnt acquired during the research in the field of application of these systems within financial decision-making process.

An important element of financial decision-making is the process of financial analysis with all its components - financial indicators, their calculation and interpretation in order to determine the financial position and performance of the company. The main focus of this paper is the evaluation of the chosen company and making lending decision. Balance sheet analysis is a key but not the only component covered by the valuation process of a given company. A very important component is also the analysis of other, non-financial parameters that are expressed qualitatively, i.e. descriptive.

The paper presents a fuzzy model as the instrument for financial decision support, i.e. making a lending decision related to the chosen company by introducing a fuzzy concept. Fuzzy logic is an important tool for modelling activities defined by uncertainty, inaccuracy and information asymmetry (Konjikušić & Radojević, 2008). This was the main reason why fuzzy sets were used in this paper as the instrument for modelling the values of the chosen parameters which were used for the company's valuation. In this way, indicator values, both financial and non-financial, are no longer defined by numbers but they are



defined by fuzzy sets. In this way, the modelled variables are joined together in order to obtain the overall score related to the company's performance, by implementing the fuzzy model rules of conclusion. Thus, the model that is presented in the paper is an example of fuzzy expert system, together with all its important features and components: knowledge base (rules of financial analysis, rules of company performance evaluation), reasoning mechanism, modules for fuzzification and defuzzification.

Within this paper, the role of an intelligent system for financial decision support based on the fuzzy logic is presented. The model was implemented, which is simultaneously using both theoretical aspects within the field of uncertainty and inaccuracy, and practical experience within the field of financial analysis and financial decision-making. In this way, a decision support system that is applicable within the banking sector was obtained.

5. ACKNOWLEDGMENT

We would like to thank dr Lidija Barjaktarovic from the Singidunum University for her support regarding valuable suggestions for improving the quality of the research.

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INNOVATION AND NEW ROLES OF EMPLOYEES IN OPERATIONAL RISK MANAGEMENT

Marija Antonijević*,
Isidora Ljumović

Institute of Economic Sciences,
Belgrade, Serbia

Abstract:

Innovations have become an everyday part of modern business, which has not bypassed the financial sector. Survival on the market depends on the way banks adapt to new circumstances and trends, such as introduction of new products, services, processes or organizational forms. The report of the Basel Committee on Banking Supervision for 2019 points out that financial technologies and innovations increase the complexity of providing financial services, as well as the level of operational risk, making it more difficult to manage and control it.

Considering the above, the aim of this paper is to try to determine the impact of the introduction of innovations on the level of operational risk, especially focusing on the human factor and employment. The results for the period 2011-2019, including 26 banks, show that there was an increase in the capital requirements for operational risk and a downsize in the number of employees. However, we could not find strong evidence that this happened due to the introduction of innovative product and services in the banking sector of Serbia.

Keywords:

banking sector, innovations, operational risk, bank employees.

1. INTRODUCTION

Banks and other financial intermediaries are in the service business, where clients constantly expect faster, more precise and accurate services that are tailored to their needs. Although financial innovations are not a new concept, current focus is on the technological innovations, that have significantly increased application in the sector of banking and finance. Rapid and intense changes and innovations are altering the world including the banking sector, bringing technological progress and social changes, both for client and employees. Banks are one of the major users of new information and communication technologies with two main goals - to cut the costs and increase the profit and to alter channels of distribution making them more efficient and convenient. Basically, banks use innovation to obtain or increase competitive advantage, improve financial and economic situation, or adjust to changing conditions (Kopernik, 2019).

In order for banks to respond to changes in the environment, it is necessary to adapt and offer customers services with a better experience that are in line with current technologies. Bank customers understand this change, but it is also perceived by the bank employees. According to the KPMG research conducted on the sample of 130 young bank employees, 75% of them expect that banks will be technology driven companies (KPMG, 2015).

There are serious indications that the introduction of new technologies and innovations in banking will significantly affect the structure and number of employees in banks around the world.

Correspondence:
Marija Antonijević

e-mail:
marija.antonijevic@ien.bg.ac.rs



Based on Wells Fargo estimates, investment in new technology could lead to layoffs of 200,000 employees in the next decade. Also, as a consequence of the introduction of new technologies and innovation in the banking sector, a large number of branches were closed because clients prefer to communicate and perform virtual transactions with the bank. The results of the research conducted by EY on 1,250 banks in 2019 indicate that the transition to digital strategies and operational risk are identified as major threats, namely in the third and sixth place, respectively (EY, 2020). As a consequence of innovative technologies, bank employees have new roles and need additional knowledge and skills. The EY 2016 report suggests that the banking sector needs fresh talent and is in search for new employees which are characterized by latest skills in all business activities (EY, 2016). The KPMG survey conducted on 132 banking CEOs in 2019 showed that 65% of respondents stated that they need to upgrade innovation process (KPMG, 2020). The internet banking had an impact on reducing the number of employees in the Netherlands, especially at mid-level jobs. About 40,000 people have been laid off in the three largest Dutch banks, which also indicate future layoffs in the sector (Neufeind et. al., 2018: 309).

The aim of this paper is to determine how the increase in operational risk, which, among others, arises due to the introduction of innovation in the banking sector, affects the roles of employees. For this purpose, we analysed available data for 26 banks operating on the territory of the Republic of Serbia. According to the analysis the number of innovations in the banking sector is rapidly increasing, together with the level of operational risk. On the other hand, there is a constant decrease in the number of employees in the banking sector of the Republic of Serbia. Increased risks and new products put additional pressure for the employees and are implying for a need to invest in employees training.

2. INNOVATION AND OPERATIONAL RISK

Frame and White are among the first authors who paid considerable attention to the concept of financial innovations. They include new products, new services, new processes or new organizational forms, which they develop in cooperation with software companies and act as the final user of innovations (Frame & White, 2004: 118,123). According to the Oslo manual, financial innovations are defined as a set of new or significantly improved solutions employed by the banking sector in all innovation areas: product, process, organisation, and marketing (OECD, 2005: 48-55). The list of innovation in commercial banking is changing quite rapidly, and while e-banking, m-banking, ATM and other have changed the

face of banking, new technology-driven innovation in financial services, or “fintech” caused fewer branches and bank employees, larger IT budgets, longer opening hours, and shorter transaction times (BIS, 2018). The report of the Basel Committee for Banking Supervision for 2019 points to higher operational risk arising from financial technologies and innovations that increase the complexity of providing financial services, making it more difficult to manage and control operational risk (Basel Committee on Banking Supervision, 2018). A survey conducted by EY in 2017 on a sample of 221 banks, covering 29 markets, showed that in the coming period, the priority for 85% of bank executives is the implementation of digital transformation programs, while 81% of them believe that the priority is to invest in technology (EY, 2018).

In order to analyse the level of innovation among Serbian banks, we have developed an indicator related to the number of innovative products and services banks offer to their clients. As relevant according to Ekpu we have identified following innovative services: e-banking, m-banking, chatbot, online credit, multifunctional ATMs and smartphone as wallet (Ekpu, 2015). Although innovations such as e-banking and m-banking belong to the first wave, they are included in the analysis in this paper, because a larger offer of these services and mass use began several years ago. The data related to products and services offered by banks to clients were obtained on the basis of information from the banks' website, as well as by sending inquiries by e-mail and talking to operators. The analysis includes 26 banks operating in the territory of the Republic of Serbia in the last three years, since we could not obtain data for previous years. The importance of innovation is reflected in the fact that the number of payment service users has increased. The number of e-banking users in the second quarter of 2020 compared to the end of 2016 increased by 80%, i.e. to 2,933,227. On the other hand, the number of users of payment services using mobile banking has increased by 2.5 times i.e. to 1,921,347 (National bank of Serbia, Statistic, https://nbs.rs/sr_RS/drugi-nivo-navigacije/statistika/). The products and services offered by banks in 2019 are presented below. While e-banking and m-banking are currently standard services for most of the banks operating in Serbia, other analysed innovations are still sporadic. Largest banks according to the market share, have introduced the largest number of innovations, which indicates their dominant role in the introduction of innovations (Table 1).



Table 1. Types of innovative products and services banks were offering in Serbia in 2019:

Bank	E-banking	M-banking	Chatbot	Online loan	Multifunctional ATM	Smartphone as wallet
Addiko	✓	✓	✓	✓		
AIK	✓	✓			✓	✓
Alta	✓	✓				
API	✓	✓				
Banca Intesa	✓	✓		✓	✓	✓
Bank of China	✓					
Credit Agricole	✓	✓				
Direktna	✓	✓				
Erste Bank	✓	✓		✓		
Eurobank	✓	✓		✓	✓	
Expobank	✓					
Halkbank	✓	✓				
Komercijalna	✓	✓	✓	✓	✓	✓
Mirabank	✓	✓				
Mobi	✓	✓		✓	✓	
MTS	✓	✓				
NLB	✓	✓		✓		
Opportunity	✓					
OTP	✓	✓				✓
Poštanska Štedionica	✓	✓				
ProCredit	✓	✓			✓	
Raiffeisen	✓	✓	✓	✓	✓	✓
Sberbank	✓	✓		✓	✓	
Srpska	✓					
UniCredit	✓	✓			✓	
Vojvođanska	✓	✓			✓	

Source: Author's calculation

As can be seen from the Table 2, in the last 3 years the number of total innovations in the banking sector has been growing, which indicates that banks are trying to adapt to the market demand and offer clients digital products and services. Transactions previously performed by customers in the bank are now replaced by new and more innovative solutions. This implies that banks are responding to the new demands of their customers and society, with almost a radical transformation. Competition among

banks worldwide is high, as evidenced by the global consolidation of the banking sectors and the decrease in the number of banks worldwide. New ways to increase efficiency and profitability and reduce costs are constantly being sought. The introduction of innovation is one of the ways to achieve these goals. In this regard, a significant number of banks have opted to develop innovative concepts and use new products and services to increase market share in a rapidly changing marketplace.



Table 2. Adoption of innovation by Serbian banks during the period 2017 — 2019

Type of innovation	Number of banks		
	2017	2018	2019
E-banking	26	26	26
M-banking	21	22	22
Chatbot	1	3	3
Online loan	1	4	9
Multifunctional ATM	5	6	10
Smartphone as wallet	3	4	5
Total	57	65	75

Source: Author's calculation

According to Basel Accords (2004) operational risk is defined as the risk of loss arising from inadequate or erroneous internal processes, people and systems or from external events. Based on this definition it is obvious that human factors, manifested as the behaviour of employees, clients and their mutual interaction have a direct impact on operational risk. The Basel definition includes legal risk; however, it excludes strategic and reputational risk (Đukić, 2016: 45). In the Republic of Serbia operational risk is defined according to the Decision on Risk Management by Banks as the risk of possible negative effects on the financial result and capital of the bank due to omissions (unintentional and intentional) in the work of employees, inadequate internal procedures and processes, inadequate management of information and other systems in the bank, as well as due to the unforeseen external events, which include legal risk (Decision on Risk Management by Banks RS Official Gazette, 2011: 40).

The bank is exposed to operational risks due to inadequate functioning of the information system, reporting system of internal rules for risk monitoring, as well as inappropriate internal procedures and their non-compliance with internal rules. One of the cases that contribute loss is the human factor. Operational risk includes human factor risks related to the insufficient culture of behaviour in relation to exposure to operational risks, insufficient number of employees, management risk, internal criminal activities, etc. Namely, due to insufficient experience, non-compliance with procedures, policies and the code of ethics, errors in work occur (Đukić, 2016: 45). In the world where bank innovations are introduced rapidly, and the level of operational risk is rising, the chance of exposing the bank to operational risk by employees is rising, usually as a consequence of inadequate training of employees or their overtime and hard work. If an employee has a heavier workload on any given day, then the total number of errors on that day increases convexly (Xu et. al., 2017).

The results of a survey conducted by Massachusetts management consulting services firm Bain & Company on a sample of 96 banks in the period 2011— 2016 showed that about 8 billion, i.e. about 4% of total losses due to operational risk occurred as a result of employee errors (<https://www.bain.com/insights/how-banks-can-manage-operational-risk/>). The issue of operational risk is mostly regulated by the Basel standard, but it has been put in the highlight of academic literature after the financial crisis. These researches have been directed to the general or a statistical perspective (see Cheng, et al. 2007; Jarow, 2008; Chapelle et al. 2008; Hatzakis, et al. 2010). Parallel to this, literature analysing different aspects of operational risk started to develop, including the influence of operational risk on human resources (Boudreau, et al. 2003; Xu, et al. 2016; Xu, et al. 2017). According to data from Serbia, after 2 years of implementing Basel II, the 54% of all events occurred as a result of human error. The causes of most mistakes are overwork and fatigue of employees (Knežević, 2013: 48-49).

In order to determine the level of operational risk, we used the data regarding capital requirements for operational risk based on the reports of National Bank of Serbia. Capital requirements for operational risk depend on the approach banks use to calculate this indicator. In Serbian banking sector based on the reports of commercial banks, vast majority of banks (80%) use Basic indicators approach, while five banks apply Standardized approach in determining the minimum capital requirements for operational risk. As we can see from the Table 3, capital requirements for operational risk are growing in the analysed period with the increase of 16% from 2011 up to 2019. On the other hand, the share of capital requirements for operational risk in total capital requirement has grown since 2011, reaching its maximum in 2019. Although, we do not have firm data and cannot claim with certainty that the increase in capital requirements for operational risk came as a consequence of the introduction of innovations,



it is likely that it played a significant role. It is reasonable to expect further increase in operational risk especially if we take into account the trends in the banking sector

regarding the introduction of artificial intelligence in business activities, which will certainly affect employees and contribute to their changed role in the new circumstances.

Table 3. Capital requirements for operational risk (bn dinars) during the period 2011 — 2019

Year	Capital requirements for operational risk (bn dinars)
2011	22.7
2012	23.45
2013	24.05
2014	24.71
2015	25.50
2016	25.74
2017	25.22
2018	25.81
2019	26.31

Source: National bank of Serbia, Statistical Annex of Banking sector, Fourth Quarter of 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019.

Although we could not find precise information in the bank reports and other documents about the amounts of capital requirements for operational risk related to new innovative products, there is a trend of increasing amounts of capital requirements, having in mind that by 2017 the largest number of banks had finished introducing e-banking and m-banking and after that they began to implement new products and services in their operations to a greater extent. We can claim to a certain extent that the innovations have contributed to the increase of system and third-party risk (as a part of operational risk), given that banks in cooperation with the software companies participate in the creation of new products and services.

3. NEW ROLES OF EMPLOYEES IN OPERATIONAL RISK MANAGEMENT

Despite the fact that the banking sector experienced growth (in respect to total assets, loans, deposits and other banking items), the number of employees in the sector has been decreasing. The number of employees fell by more than 6,000 during the analysed period. This reduction is partially due to structural changes in the banking sector, such as mergers and acquisitions, reducing the number of branches and cutting costs, but one of the reasons also include the introduction of innovation and digitalization as claimed by BIS (BIS, 2018).

Table 4. Number of employees in Serbian banking sector during the period 2011—2019

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Number of employees	29,228	28,394	26,380	25,106	24,257	23,847	23,055	22,830	23,087

Source: National bank of Serbia, Statistical Annex of Banking sector, Fourth Quarter of 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019.

No matter structural changes in the Serbian banking sector, the introduction of innovation, higher level of capital requirements for operational risk and fewer employees can indicate two things. Either the new technologies caused by digitalization are replacing the employees or employees face higher workload and pressure that contributes to the creation of tension among employees and increase the frequency of their mistakes. In the management of employees and clients, the effects of workload

and stress on employees could entail severe operational risks (Xu et al., 2017). We have tried to determine what was the dominant cause of the decrease in the number of employees and what were the units mostly affected by this downsizing. Unfortunately, we did not manage to obtain the data on changes of the number of employees in the banking sector of Serbia according to the units they are employed in. We leave the possibility that there was an increase in the number of employees in the risk department,



including the stuff dealing with operational risk. However, having in mind that activities of all employees are one of the sources of operational risk, downsizing puts an additional pressure, especially to those dealing directly with new products and services.

The bank's productivity and profitability, beside technology and capital, mostly depend on quality of work employees are performing. On the other hand, the success in operational risk management is directly related to performance of employees, given that operational risks are related to behaviour of all employees in the bank. According to the Operational Risk Function Survey 2018 Operational Risk professionals identified the ability to influence people as one of the most required capabilities, followed by the technical acumen and product knowledge, while skills associated with the traditional risk measurement technics, such as research and quantitative skills and risk stress testing were classified as currently least useful (UK Finance, 2018). Also, due to increasing exposure to operational risk as a result of the introduction of new products, as well as the threat of system failure and greater dependence on third parties outsourced by the bank, it is necessary to employ experts in the operational risk department.

4. CONCLUSION

The banking sector has been facing a number of changes in recent years, including the introduction of innovations in their operations. Banks are adapting to the new environment, strengthening the market position, increasing the opportunities for acquiring new and retaining existing clients, as well as achieving cost savings and operational efficiency.

The results of this research indicate increased level of innovation, a higher degree of operational risk, but also a decrease in the number of employees. Although numerous studies and regulators indicate that the introduction of innovations increase operational risk, we have not been able to find firm evidence of this relationship and based on the analysis and review of research we have only been able to draw general conclusions. Introduction of new products and services can cause negative experience for employees dealing with them. They might face operational risks of which they are not aware, did not receive explicit demand to identify or monitor these events, or there is a fear about reporting a personal mistake. With the constant innovations and evolution of the workplace in banking sector, employees need to be able to adapt to fast changes and adapt new skills needed to perform new work tasks. Although, investment in their training is recognized as one of the major solutions, it is not always implemented and employees in this case need to have the ability to learn from experiences and to apply that learning to new and

different situations. Banks that are leaders in introduction of innovation have already identified these issues and have put behavioural culture in relation to exposure to operational risks as one of the priority goals.

5. ACKNOWLEDGEMENTS

This paper is supported by the Ministry of Science and Technological Development of the Republic of Serbia.

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THE NECESSITY OF DIGITALIZATION OF THE BANKING SYSTEM - A CHANCE OR A THREAT TO THE DEVELOPMENT OF THE BANKING MARKET?

Tamara Vesić^{1*},
Cvetko Lazović²,
Jovan Petronijević¹

¹Faculty of Business Economics and
Entrepreneurship,
Belgrade, Serbia

²Megatrend University,
Belgrade, Serbia

Abstract:

The subject of analysis in this paper are the characteristics, development factors and economic effects of the development of digital ways of communication between the bank and the client. The starting point of the paper is the necessity of electronic banking, as a type of market communication, given the positive impact on the speed, efficiency and ultimately the profitability of the bank's operations, which has been shown to have electronic business in all sectors. The corona virus pandemic has additionally contributed to the acceleration of digital transformation in Serbia, and practice has shown that people are ready to switch to digital payment methods, given the increase in the use of the bank's online services, it was forbidden to leave homes. The paper explains the mechanisms of business digitalization through explanations of the advantages and disadvantages of electronic banking, from the bank's point of view and from the client's point of view, and through a recent survey the prospects for the development of banking services if banks specialize in acquiring a certain target group.

Keywords:

digitalization of banks, electronic banking, technological trends, FinTech industry.

1. INTRODUCTION

In the last two decades, the international financial system has undergone significant structural changes. The strong increase in international financial flows around the world, primarily aided by the liberalization and privatization of financial markets, has completely changed the environment and the legality of the market. In the conditions of globalization and the development of computer technology, the borders between the national and the world have disappeared, which has opened unimaginable business opportunities for companies and financial institutions. The most important changes and trends that can be recognized are disintermediation (reduction of the role of financial intermediaries), development of securitization, changes in the regulation of business of financial institutions and financial innovation. Changes in financial systems are observed in financial instruments, in financing technologies and techniques, in the emergence of new financial institutions and in major changes in the regulation of financial institutions (Vesic & Petronijevic, Trends in profitability of banks in Serbia through rational analysis, 2018).

In parallel with the process of increasing competition from non-banking financial institutions and the takeover of a good part of the market, the process of rapid integration of a small number of solid, large banks and other financial institutions is characteristic. Efficiency in the use of automation and other technological innovations means increasing the volume of business while respecting business according to the principles of economies of scale. That is why banks offer their services in more and more markets in an effort to expand the circle of their clients.

Correspondence:
Tamara Vesić

e-mail:
tamara.vesic@vspep.edu.rs



This process of geographical expansion and consolidation of banking and other financial institutions has already affected cross-border integration, taking on the dimensions of globalization of the banking and, more broadly, the financial sector. In that way, international and transnational banks are being created, for whose operations there are no borders, which, of course, has been made possible by the deregulation of the financial sector in recent decades. It should be borne in mind that the liberalization of the financial sector and the entry of various companies in this area, which are increasingly bringing the offer of their products and services to banking, had not only negative but also significant positive sides, primarily for users of these services. Increasing competition and the expansion of the range of services is a consequence of the weakening of state control - deregulation - in the financial sector (Pantelic, 2018). This process began in the United States by removing interest rate maximization and expanding the scope for non-banking institutions to operate. However, it has also led to a significant increase in business risk and increased risk of bankruptcy, which is why the international community has responded by introducing international standards and strengthening the control of central banks and relevant regulatory institutions in order to prevent major financial crises and fractures.

The subject of analysis in this paper are the characteristics, development factors and economic effects of the development of digital ways of communication between the bank and the client. The starting point of the paper is the necessity of the existence of electronic banking, as a type of market communication. The aim of this paper is to point out the positive impact on the speed, efficiency and, ultimately, the profitability of the bank's operations, which has been shown to have e-business in all sectors. The paper is structured in three parts. After introductory considerations, the first part of the paper gives the advantages of using electronic banking for both the bank and the client. The other side of the coin is the shortcomings of electronic banking, which are presented in the second chapter of the paper. Nevertheless, we are of the opinion that investments should be made in digital communication channels and electronic banking should be further developed. This has proven to be a good solution in conditions when changes are taking place in the world, as has happened in 2020, when the world almost stopped due to the corona virus pandemic. Precisely because of this, the third part of the paper is a review and commentary of McKinsey's research. Finally, conclusions were drawn with a view of the references used.

1. DRIVERS OF DIGITAL CHANGES IN THE BANKING SYSTEM

The organization and functioning of banks is very important for the rational and efficient functioning of the financial system. In our country, there are problems of vagueness of domestic legal regulations, but also the real fact of unfavorable business conditions of banks in the past period, which has a limiting effect on the rationality and efficiency of their operations. It should also be borne in mind that the banks' operations are also affected by the monetary policy measures of the National Bank of Serbia (Marjanovic et al., 2007). Clarity and adequate regulation of the regulation and functioning of other financial institutions is also important for the whole financial mechanism (Andjelic et al., 2017).

We can manage risks through preparations for future events, but unexpected and expected risks cannot be eliminated. We also have the opportunity to reduce the likelihood of surprises by collecting and using timely information (Barjaktarovic, 2013). Therefore, it is necessary for the banks to apply adequate banking marketing and use modern information technologies in the right way (Sanader, 2014).

The reason for the introduction of new technologies in the banking environment is the attempt to develop new products and services of interest to customers within the business of the banking system. The development of technologies has led to structural changes in banks (Ignjatijevic et al, 2018). The advantages that technologies bring to the banking sector are many and are reflected in the reduction of operating costs, improving customer awareness of banking products and services, innovation in business and offering different products and services, increasing supply efficiency and emphasizing the customer as an individual.

Mobile banking provides increased sales and reduced costs. Reducing costs per transaction is one of the goals of every business. This goal exists in order for the bank to make higher profits, but also in order for customers to have lower costs (Jovic et al, 2019). Several studies show that the highest costs per transaction are in the case of rolling banking operations in the traditional way, i.e. in a bank branch. On the other hand, when we talk about internet banking, the costs are much lower: process automation, doing business without employee participation, etc. Mobile banking provides advantages over traditional ways of doing business with the bank through the provision of specific services that ensure customer loyalty and resolve time-critical situations. Changes in technology increase the efficiency of communications and business between the bank and the bank. The introduction of new technological solutions leads to changes in the way of performing



communication activities as well as the way of building long-term relationships between clients and the bank.

Electronic banking has advantages over classic because (Berger et al, 2017):

- Reduces transaction costs,
- Provides faster turnover of funds,
- Provides time savings,
- Allows you to perform transactions from anywhere,
- Provides constant insight into the account balance and transactions for each batch of accounts.

Banks and their financial competitors are also going through a process of information revolution, which has a strong impact on enriching the range of products and services provided to customers. Faced with rising operating costs, banks are increasingly resorting to the process of automation and the use of modern electronic systems. The most obvious example of such changes is the mass use

of ATMs (automated teller machines - ATMs) and points of sale connected to banking computer systems (POS of point terminals - POS). Setting up the vending machine allows customers 24-hour access to current accounts to withdraw cash or deposited funds, as well as a number of other services. Also, the development of home banking has enabled the provision of various banking services within 24 hours directly from the office or home, globally, from anywhere in the world. The only necessary condition is a good Internet connection (Salem, Baidoun, & Walsh, 2018). Such tendencies have given economists the right to determine that the classic, personal contact of bankers with clients will give way to electronic communication. However, a significant number of clients are still prone to direct contact and personal consultations, especially with sensitive and advisory banking services. The advantages of electronic banking for both the bank and the clients are indisputable and are given in Table 1.

Table 1. Advantages of electronic banking

For the bank	For the client
Greater reputation and image in the market	Lower costs of access and use of services
Faster response to changes in the environment	Availability 24x7x365 and time savings
Greater market penetration without space and time constraints	Transaction speed
Using the Internet to advertise the sale of new financial products	Digital transaction record

Source: (Gurau, 2000)

2. DISADVANTAGES OF DIGITALIZATION OF THE BANKING SYSTEM

Globally, millions of customers nowadays use mobile phones to use banking services. Transaction services are related to the risk that customers and banks take. The risks are very specific because they are related to very rapid changes in technology (Vukosavljevic et al, 2016). Disadvantages such as insecurity, inconvenience, high usage costs (due to the price of internet on a mobile device) are often factors that limit the widespread use of mobile banking. Unavailability and congestion of the system affect the discomfort in using mobile banking. On a technical point of view, we can talk about the use of various applications that are not authenticated, confirmed and protected on the mobile phone, viruses on the network, unprotected Wi-Fi connections, etc.

Given the significant costs of using and maintaining each supply channel, banks choose the channel that provides the best cost-benefit ratio. Although new communication channels take precedence in communication with

the client, the branch is necessary. Some of the reasons are: relationship with non-computer literate clients, because of the need of banks to perform tasks requiring personal contacts, bank staff with clients (eg signing contracts, advisory services, etc.). In this regard, internet banking is the cheapest form of banking services, which is available 24 hours a day, without space constraints. The main weakness of this form of banking is the lack of security.

However, in addition to clients and banks, they take on the risks of mobile banking:

- Operational risk represents a possible loss due to lack of system security and risk of misuse by customers.
- Strategic risk occurs when a bank defines unclear business decisions or does not adapt to changes in the environment. In these cases, mobile banking can cause counter-effects on the bank's results.
- Legal risk arises when the law is not respected or the law is circumvented. Frequent cases for that are e.g. money laundering.



- Reputational risk is most common when we talk about the risks that banks face in modern ways of doing business. When the application does not meet customer expectations, if the system is often unavailable, it can lead to negative customer reactions.

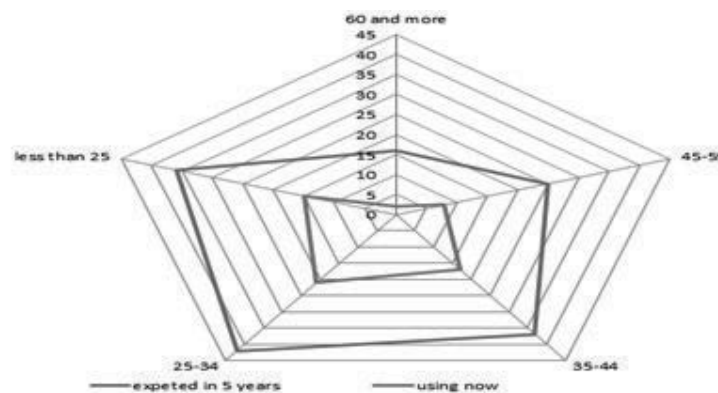
Disadvantages of mobile banking concern the protection of information and verification of customer identity. Disadvantages of the system of protection and abuse on the Internet, the lack of privacy, lead to this (Medic & Zivadinovic, 2017). Banks strive to allocate certain aspects of customer business from branches, as a classic form of communication with customers, to alternative channels. The goal is for mobile banking to benefit as many customers as possible. However, the use of mobile banking depends on the clients, i.e. their age group and readiness to use information technologies (Vesic et al, 2019).

3. PROSPECTS FOR INVESTMENT IN DIGITALIZATION

As modern man becomes more and more accustomed to the availability of a "network" (Internet) on which he can find almost any necessary information, he integrates it into his life more and more quickly; for example, if we want to quickly find out where to buy a book by a certain author or on a specific topic, which pharmacies are open, to find the street, etc ... (Mikaric et al, 2016).

McKinsey research shows who should be the target group for bankers (McKinsey, 2011). The comparison was made by comparing the age category of clients with the use of mobile phones in relation to total banking assets, and the results showed that young clients, representing clients under the age of 25, use modern technologies every day, especially newer versions of mobile devices. Viewed from the aspect of long-term strategy, they represent the bank's future clients and represent recommendations to banks to turn to attracting precisely these clients. Employees with a salary, age groups 26 to 60, who are mainly carriers of mobile banking, are the ideal target group for digital use of online services today. Finally, the third group of respondents was older than 60 years, mostly retirees. This is as a group of clients that banks want to activate to use mobile banking, in order to reduce the operating costs of branches. We are witnessing that senior citizens are the ones who have a harder time mastering information technologies and that their tendency to accept digital innovations is less than in some other population category. Nevertheless, banks expect an increase in the use of mobile devices for banking activities in the coming period (Illustration 1).

Illustration 1. Status and projections of groups of clients who use and who will use mobile phones for banking operations



Source: (McKinsey, 2011)

The global corona virus pandemic that the world has recently encountered, has shown that people are ready for accelerated digitalization. This period awakened companies in all spheres to move forward, towards digitalization. A number of banks in Serbia have noticed a jump in online payments during the months when citizens were prevented from going anywhere. Modern business conditions impose the use of new information technologies as a basis for the survival and development of every business entity.

The banking sector of Serbia is increasingly exposed to competitive business conditions that are global in nature and impose the need to use digital tools for the sale and promotion of related banking products and services.

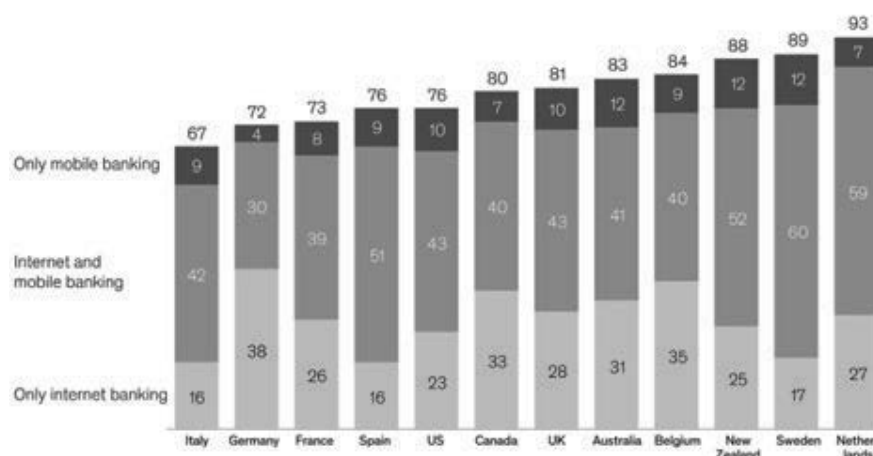
As banks strive for digitalization both to improve efficiency and to improve the user experience, they must meet different customer preferences. In some cases, clients embrace new technologies, but there are times when they stick to old ways of doing business out of habit or



simply resist resistance to change. According to the latest study of clients in banking conducted by McKinsey in a sample of 45,000 clients in 20 countries, it has been shown that banks are forcing rapid changes in the way they connect and nurture relationships with their clients. The same study concluded that digital communication channels are

becoming increasingly important to users, even in countries that have been slower to embrace digital transformation. In Italy, for example, more than two-thirds of customers now use digital channels. Meanwhile, in countries where digitalization has progressed faster, more than 85 percent use them.

Illustration 2. Percent of consumers that use channel at least once a month



Source: (McKinsey, 2018)

As a result of greater adoption of digital data, the bank's clients are less likely to visit branches in all districts covered by the study. For example, in Germany, the percentage of people visiting a branch once a month dropped from 60% in 2012 to 31% in 2018, while in Sweden it dropped from 27% to only 8%. In general, clients are increasingly using digital channels of communication with the bank, and they visits branches for special advice, solving complex problems or for buying complex products such as mortgages.

4.CONCLUSION

If we look at EU strategies concerning digital banking and technology, they are recognized as a significant factor influencing growth and innovation. Modern trends, due to increased technological development, present challenge for the all-world banking sectors. In this paper, we could see that mobile banking has the potential to become widespread and easily accepted by a large number of new clients. Mass use of modern technologies has increased the accuracy of transactions, but also reduced the time required to process transactions, increase employee productivity, reduce business costs and reduce the time spent by clients in bank branch. Research shows that banks that keep up with the new, digital age are gaining new customers faster and thus achieving higher market growth. In connection with the above, mobile banking provides

banks with the opportunity to generate new income. The new way of doing business also means adjusting long-term strategies and turning to new, younger clients. In that way, banks would ensure the continuation of making profits in the future as well. In addition to developing innovative products, banks must provide customers with security in the use of mobile or Internet applications. In that way, they would reduce the risks that online transactions carry, but also increase the trust of clients and thus, finally get rid of reputational risk. Finally, if banks want to compete in the marketplace in the modern age, they must quickly adapt to new changes, along with the development of smartphones and tablets.

5.ACKNOWLEDGMENT

This work is part of the European Cooperation in Science and Technology (COST) Action No. CA19130, called FinAI – Fintech Artificial Intelligence in Finance – Towards a Transparent Financial Industry, for the period 2020–2024.

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RESILIENT DIGITAL FINANCIAL EDUCATION FOR YOUTH – EUROPEAN MONEY QUIZ PROJECT

Sladjana Sredojević^{1*},
Sophia Ziakou²

¹Head of Bank Training Center
and Specialist for International
Cooperation, IFIs and Education in
the Association of Serbian Banks,
Belgrade, Serbia

²Special Advisor at the Hellenic
Bank Association,
Athens, Greece

Abstract:

The subject of this paper is the analysis of the European Money Quiz, as a digital learning initiative, as a direct response to the sustainable and resilient digital education for youth. Although the platform uses the digital form, in the center of this initiative are children, their engagement and improvement of their financial literacy. In order to illustrate that, additional analysis is conducted at the country level, from the perspective of two national banking associations from the Southeast Europe region: Serbia and Greece. The aim is to show how European Initiative in digital platform brings resilience to different concepts of organization of education for youth in two countries. Such a disclosure of best practices and experiences, should help policy makers and practitioners to provide proper supply in proper time, including (re)evaluation or upgrade of the existing programs and consideration of new priorities, target groups and topics (local context).

Keywords:

financial education, digitalization, youth, banking.

1. INTRODUCTION

A more robust, safe, digitally transformed, and transparent banking and financial services sector needs responsible consumers who are actively participating in improving their financial awareness, knowledge and well-being. Financial Education supports efforts of consumers to be properly informed in the decision-making process on choosing intelligent, appropriate, and suitable financial products. Given the importance of developing young people's financial literacy skills and current policy efforts to introduce this subject in the school and/or to introduce national strategy on Financial Education, developing and introducing new tools for financial education of young people is inevitable action both for public and for private sector - Banking and Financial services sector as the active stakeholder. One of the target groups of this segment of population - pupils 13 to 15 years old is subject to regular evaluation of financial literacy level with the Program for International Student Assessment - PISA implemented by the Organization for Economic Cooperation and Development. A robust measure of the financial literacy of 15-year-old students provides information that can indicate whether the current approach to financial education is effective (OECD, 2014). This Paper as an empirical study is presenting one digital/online Projects of the united banking sector of Europe as its direct contribution to the continuous, sustainable and resilient financial education of young students aimed to give positive impact on effectiveness of current approaches in the public sector in this field.

Correspondence:
Sladjana Sredojević

e-mail:
sladjana.sredojevic@ubs-asb.com



2. LITERATURE REVIEW

According to the Organization for Economic Co-operation and Development (OECD), following definition of financial education is often used: *“Financial Education is the process by which financial consumers/investors improve their understanding of financial products and concepts and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being”* (OECD, 2020, pp 26).

The European Banking Authority (EBA) published its second edition of the Financial Education Report - FER (EBA, 2020) in 2020. The Report is based on the EBA financial education repository, which identifies, for example, that awareness-raising campaigns remain among the key tools used by national authorities to reach wide audiences and, in certain cases, to alert consumers to potential risks they may face regarding the use of financial products and services (e.g. crypto-assets). In addition, it highlights the increasing role of financial innovation and the growing focus on specific target groups for financial education and literacy initiatives, such as children, youth and elderly. *“An analysis of the repository reveals that the majority of the 123 initiatives reach their audience by means of online resources. This exemplifies the significant role that online (digital) tools play in financial education today, which is in accordance with the broader general trend towards digitalization of the society.”* (EBA, 2020).

The literature which currently exists surrounding the use of digital technology in education outlines the ways in which it is currently used and the practices which teachers are currently using. Authors like Liu, Navarrese and Wivagg (2014) have demonstrated that mobile devices like the iPod touch can provide English Language Learners with significant support for language and content learning, and extend learning time from classroom to home. Koszalka and Ntloedibe-Kuswani (2010) review a broad range of case studies which research the various educational applications of applying mobile technology within a classroom environment, concluding that the benefits of mobile learning are not yet understood from the perspective of whether technology is safe or disruptive to use. At the same time, the issue of accessibility of digital an online technology for financial education is open and there is still a lot of work to do in order to make digital technology easily accessible to students and this is something which school administrators need to continue to focus on. As per the findings of the research study done by Neha (2016), it was found that digital technology does help teachers to teach financial literacy to students in elementary schools. Overall, it is a tool which has shown to be effective for student learning.

The study concludes that a combination of these two areas of interest is certain to provide students an enlightening learning experience.

Methodology used in this empirical study is relying on several methods: synthesis, analysis, method of comparison and analogy, method of description and interviews. Research objective is to demonstrate that initiatives towards financial resilience are manageable even in turbulent times when digital tools (financial technologies) that are supporting financial education can bring great added value to the level of financial literacy of youth.

3. DIGITALIZATION AND FINANCIAL EDUCATION IN TURBULENT TIMES

Current conditions of life and work are characterized by rapid technological changes. Modern society, known as a digital age, is already largely conquering the elements of the fourth industrial revolution and is already based on accelerated digitalization paving the way for the application of technology in science, economics and many other fields. The role of digitalization is going much more beyond these; namely, it is expected that technology and digital innovations will help governments in better and faster implementation of Sustainable Development Goals, climate change targets and other relevant national development goals. However, although variety of digital financial services easily accessible are constantly being provided (supply side), we should not neglect, at the same time, the interests and satisfaction of clients or service users which cannot be achieved without proper level of their information, education and capability to make sustainable and resilient financial decisions (demand side).

The need to educate young people in the field of financial services, economy and finance – various disciplines integrated in the financial education activities – is growing, particularly having in mind the natural inclination of this segment of population in their use of digital tools. It is not an exaggeration to say that the youth of today spend more time watching television and using digital technology such as smartphones, iPads, tablets, laptops than they do running around or playing outdoors (Neha, 2016). In addition to that, financial literacy is a topic which is not being compulsory taught to elementary school students in most of the countries despite the importance and relevance it holds in everyday life. Therefore, enabling young population to have an access to technology brings potential to transform the way students learn, enhance their knowledge and apply technology in ways that will positively transform their future decisions in life.



4. EUROPEAN INITIATIVE IN BANKING SECTOR AS A DIGITAL EDUCATION TOOL

4.1. European Money Quiz – European Perspective

European Money Quiz (EMQ) is a digital learning initiative dedicated to children and youth. It is the result of the common effort of thirty-two National Banking Associations under the coordination of the European Banking Federation (EBF)¹ in order to:

- address and improve the financial literacy level of students 13-15 years old, and
- prepare them for the class competitions to be held at national and European level.

EMQ was carefully designed by the Financial Education Project Group (FEPG)² of EBF and it is part of EBF commitment to provide consumers with a more sound understanding of financial services.

From its launch in 2018, EMQ was successfully implemented and even won the prize for the best 2018 Trade Body Campaign in Europe in the Brussels awards ceremony hosted by the UK-based Public Relations and Communications Association (PRCA)³. Its success and acceptance lie on the fact that it is an online well-structured educational tool for students and teachers using the 'fun/gaming' element. EMQ comes with a toolkit, which includes sample questions, practice quizzes, teacher's instructions as well as videos, info-graphics and other materials that are all available online⁴ to national coordinators also in the language of their country⁵ making full use of digitalization tools. Moreover, the quizzes are displayed on Kahoot, a Norway-based online quiz platform, which is already used in millions of classrooms worldwide and can be available to students also for personal practice 24/7.

Another basic element for EMQ recognition was the fact that EBF inserted the element of competition for the students (National and European Finals).

Every member of EBF, National Banking Association, was responsible to formulate a national competition, the winners of which would represent the country to the European Finals, with physical presence in Brussels. The prize for becoming a National Champion and the possibility to become the European Champion of EMQ gave students extra motivation.

On a national level, the option of hosting the finals in live-streaming via YouTube with the questions appearing directly on smart-boards or displays in classrooms helps national Banking Associations to access more schools in more dispersed areas without the need of physical movement or organization of local written or oral examinations. In Live-streaming the answers are given directly online, allowing each classroom to see how well it competes against others in their country as soon as the quiz is ended. On European level the finals are conducted with physical presence in order to provide the students with a complete educational experience (2-days-activities program). All national winners compete with each other simultaneously in their native language on the same thirty financial literacy questions having the feeling of equal participation. The questions address topics such as saving, debt, investment, compound interest, inflation and also cyber-security. The European Champion is announced straight after the end of the competition in a beautiful ceremony.

The global pandemic (Covid 19) context and national lock-down measures posted a severe setback for EMQ in 2020. National coordinators reported to EBF that classroom participation dropped down considerably due to the closure of schools because of sanitary measures. Additionally, restrictions in traveling and gathering of people prohibited the realization of the European Finals in Brussels. But thanks to the innovative teaching methods⁶ behind the EMQ it was made possible, on the one hand, for the teachers to reach out to their students at home and easily integrate EMQ in their online teaching programs and, on the other hand, for national banking associations to conclude their national finals. Also, EBF used the tool of live streaming as an alternative to the European Championship in Brussels. Thus, despite the global pandemic context, as seen in table below, the EMQ European Finals were live streamed on June 16th, 2020, with the participation of 28 countries⁷ with 22 national champions. Kahoot, also recorded five times more sessions played than the previous years.

1 EBF is the voice of the European banking sector, uniting 32 national banking associations in Europe that together represent some 3,500 banks – large and small, wholesale and retail, local and international – employing about two million people. For more information visit: www.ebf.eu.

2 FEPG is the project group of EBF which works on financial education. It is composed by the representatives from National Banking Associations, members of EBF, with the scope of gathering good practices, running surveys and reports, creating educational materials, etc. Among the projects of FEPG is also the establishment of the institution of the European Money Week (EMW) which was first launched in 2015 and takes part each year in April. From 2019 the European Money Week is aligned with the Global Money Week (GMW) which is under the auspices of OECD.

3 PRCA jury, consisting of European public affairs professionals, praised the European Money Quiz as a project that managed to make a significant impact on a relatively low budget. For more information <https://www.ebf.eu/ebf-media-centre/european-money-quiz-initiative-wins-pa-award-in-brussels>.

4 The special dedicated section on the website of EBF is <https://www.ebf.eu/europeanmoneyquiz/>.

5 Almost all National Banking Associations have created special sections on their website for EMQ.

6 Live-streaming options on YouTube and Kahoot Quiz platform.

7 The countries are in alphabetical order: Albania, Austria, Azerbaijan, Belgium, the Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, the Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Serbia, the Slovak Republic, Slovenia, Spain and Sweden.



Table 1. EMQ European Competition

Year	Countries	Languages	Pondium	Kahoots plays
2018	27	24	Poland, Ireland, Germany	45.000
2019	28	26	Slovenia, North Macedonia, Germany	100.000
2020	28*	22	Everybody	500.000

* 23 national finals. Albania, Belgium, Azerbaijan, Estonia and Lichtenstein had to cancel their national finals.

Source: EBF

EBF reaffirmed its commitment to support and promote EMQ. The 2021 competition is designed to be concluded in April 2021. It is amazing to realize that an online game can be used to inform and engage students to learn in a funny way about personal finance and difficult financial terminology. For the banking sector the promotion of financial education is a core priority, a true commitment to provide consumers, current and potential, with a more sound understanding of financial services and digitalization has to be used on that behalf.

4.2. European Money Quiz – perspective of selected countries

European nature of the EMQ project is an outstanding value. Developed jointly by almost 30 national banking associations from Europe (centripetal), this project also has various special characteristics since it is being locally implemented (centrifugal), adapted and applied with different approaches. Following sections will analyze differences and similarities in local implementation of the EMQ project as an online educational tool in two territorially close but geographically different countries of the South East Europe - Serbia and Greece.

Serbia – Serbian Bank Association

Republic of Serbia is a landlocked country in the central part of the Balkan Peninsula, South East Europe. In Serbia, there is no national strategy for financial education and financial literacy is included only as an inter-competencies subject in the school curriculum.

Having that in mind, Association of Serbian Banks (ASB) as the national banking association representing all banks operating in Serbia since its establishment in 1921, have decided to support national financial education efforts by joining European Initiatives launched by the EBF - European Money Week and European Money Quiz. Success achieved within engagement in the FEFG of the EBF, and experience gained, was the starting point in initiation of the ambitious plan of the Financial Education of the ASB and its members banks. Beside local initiation of the European Money Week, launching the Project of European Money Quiz in 2018 represented additional

strategic, socially responsible and very popular initiative in public, media, schools, teachers, students. Visibility gained contributed to many other ASB and brought additional relevance reflected in some new strategically important projects that followed; one of them was the Project of the Government of the Republic of Serbia of Introduction of the Financial Literacy in the Educational System of the Republic of Serbia, in which ASB's national coordinator of the EMQ⁸ became a member of the national strategic Project team. The approach in implementation of the EMQ in Serbia since 2018 was based on the cooperation with the Ministry of Education of the Republic of Serbia, who supported the EMQ by officially inviting all schools operating in Serbia to join the quiz with their pupils (13-15 years old). This approach was followed later on, as a good practice, by some other countries in Europe. EMQ was held since 2018 regularly, with a very positive media back up. Year 2020 was challenging, due to the fact that schools closed on March 16th, 2020 which was just a day before a national competition scheduled for March 17th, 2020. Despite such an extraordinary obstacle, competition was held via Kahoot and YouTube platform on agreed date, but with a reduced number of pupils who participated. Table 2 below represents statistics on the EMQ in the Republic of Serbia:

⁸ Both authors are National Coordinators of the Project of the EMQ in their respective countries (Serbia - S.Sredojevic, Greece - S.Ziakou).



Table 2. EMQ in Serbia

Year	Date	Classrooms	Schools	Kahoots plays
2018	16.03	77*	51	154 pupils
2019	27.03		157	551 pupils
2020	17.03		107	250 (out of 590 registered)

* This year, invitations have been sent out to the classrooms. In the next years, participation and competition will be allowed to individual students directly.

Source: ASB

Beside its benefits for pupils, schools and banking sector, as main stakeholders, EMQ in Serbia is a direct contribution of the banking sector to the effort of the Government of Serbia in improving the level of financial literacy of students (13 to 15 years old) who are target group for future PISA assessment, too.

Greece – Hellenic Bank Association

Greece is a country located in South-eastern Europe at the crossroads of Europe, Asia and Africa. It is a country with special characteristics as it has the longest coastline on the Mediterranean Basin and 11th longest coastline in the world in length, featuring many islands of which 227 are inhabited, while mainland is at eighty percent mountainous. All these features make Greece unique but at the same time impose great barriers in everyday life. In Greece there is no national strategy for financial education, and financial literacy is included only as a sub-subject in the school curriculum.

The Hellenic Bank Association (HBA) is the institutional representative of the vast majority of all Greek and foreign credit institutions that operate in Greece. HBA, also Full Member of EBF, recognizes the special interaction between the financial literacy of citizens and their level of prosperity. Thus, HBA develops and promotes a variety of programs⁹, mostly targeting students/pupils (8-17 years old), who are the most sensitive, and at the same time, the most dynamic and promising group of the society.

In cooperation with the Ministry of Education, HBA has been running, since 2018, the Hellenic Competition on Money, which is the first stage for the European EMQ Competitions. Taking full advantage of the innovative learning activities and digital EMQ toolkit that was created by FEPG EBF, HBA has been able to reach schools all around Greece as the educational material is simultaneously available to every school regardless of its location. Moreover, the special dedicated section on HBA website¹⁰ and Kahoot platform provides all day access to the material for everybody (teachers, pupils, parents) while information can be/and are rapidly updated.

Adequately, the use of live-streaming option for concluding the National Finals provides a sense of equal opportunity to all pupils regardless if they come from dispersed and isolated areas or from big cities. This feeling is actually the secret ingredient for the continuous pupil's commitment to the EMQ project. As it can be seen in the table below the participation of schools is increasing rapidly every year and the added value is that 50% of participation comes from schools in the periphery and not only Athens (the capital) covering equal geographical representation of Greek territory. An interesting evidence is also the fact that despite the severe lockdown measures and three months closure of schools due to the pandemic, the schools that participated in 2020 National EMQ covered 7 out of 9 geographical regions of Greece¹¹, while the reason for the withdrawal of some schools in the National Finals was caused by the imposition of extra locality restriction measures by the Government.

⁹ For more information visit: <https://www.hba.gr/info/FinancialLiteracy>

¹⁰ <https://www.hba.gr/info/emq>

¹¹ The schools came from Central Greece, Macedonia, the Peloponnese, Thessaly, Epirus, the Aegean Island and Crete.



Table 3. EMQ in Greece

Year	Date	Classrooms	Schools	Pupils engaged
2018	13.03	53	16 private and 9 public	500
2019	27.03	86	17 private and 12 public	1500
2020	03.06*	72**	17 private and 16 public	1100

* This year, due to the pandemic, the date of the National finals was transferred 3 months later according to schools' request.

** Initial Participation was 109 classrooms, but only 72 classes competed during finals.

Source: HBA

EMQ is not the only project of HBA concerning financial literacy, but definitely is the one that during the Covid-19 pandemic proved to be really adjustable and resilient to the current circumstances. The use of EMQ digital tools helped to overcome physical restriction measures and facilitated the immediate integration to the school distance learning activities so that financial education remains an ongoing process. In addition, financial literacy is not just a 'need' but a 'necessity' for everyone especially in difficult and unexpected times.

5. CONCLUSION

Financial literacy is recognized as an essential life skill (G20, 2012, OECD/INFE, 2012), and according to 2005 Recommendation of OECD '*financial education should start at school. People should be educated about financial matters as early as possible in their lives*' (OECD, 2005). Also, research suggests that children form their financial habits as young as seven years old (Whitebread and Bingham, 2013) influenced throughout their childhood by different variables. Young people adopt new technology rather quickly, so we can even consider them as "digital natives". But just having the ability to properly use technology and devices does not protect them when using digital payments on their phones, purchase mobile credit, and use mobile credit for online gaming and in-app purchase (OECD/G20/GPFI, 2020). As such, acquiring new financial skills and competencies is a necessity for young people. Many international organizations and financial sector institutions are dedicated to this field, which is also recorded in a growing number of policies, reports, and projects (e.g. OECD, EBA, EBF). If students can be taught financial responsibility from a young age, it will equip them with a skill they can use throughout their lives. Examples of the EMQ and its national implementations throughout Europe, is bringing positive improvements and good practice at both European and national levels.

6. LITERATURE

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DOES GOOGLE FAVOUR ITS OWN PLATFORMS IN SEARCH VISIBILITY?

Nataša Krstić

Faculty of Media and
Communications (FMK),
Singidunum University,
Belgrade, Serbia

Abstract:

Google is the most dominant search engine in the world. Due to its monopoly, it is often targeted by regulators, accused of imposing its services, platforms and bias algorithm. The paper aims to determine whether a presence on Google-owned platforms improves the website visibility on the search engine, expressed through the search engine optimisation (SEO) score. For this purpose, the web presence of eight private universities in Serbia on Google My Business, Google Maps, YouTube and Google Images were analysed with software screening and observation of the search engine result page. The research results confirmed that Google favours its platforms, as universities with a symbiotic presence on all of them recorded the highest SEO score. Furthermore, Google gives the highest priority to a verified Google My Business listing, as it signals the authority of the university web presence. Since Google uses more than 250 factors in website ranking, the findings should be interpreted with caution.

Keywords:

search engine, Google My Business, Google Maps, YouTube, Google Images.

1. INTRODUCTION

In the first decade of the new Millennium, which is considered as the early stage in the development of the internet, there was still a fierce competition between search engines (Goehler, Cader, & Szu, 2006). In 2005, Google had almost half of the market share (46.2%), Yahoo! over one-fifth (22.5%), and next to them were a dozen other smaller players in the search engines arena – MSN, AOL, My Way, Netscape and others (Fan, 2005). As of 2014, the situation changed significantly. Yelp, which helps consumers find and review restaurants and other local services, stated in its European antitrust lawsuit that the results on Google's search engine favour Google Plus, its direct competitor (Kanter, 2014). Foundem, a vertical search engine for finding the lowest online prices also filed a lawsuit claiming that Google deliberately ranked its own products ahead of Foundem in search results and sought damages for its business losses (Southern, 2020). Furthermore, in 2017, the European Commission (EC) imposed a record fine of €2.42 billion on Google in the Google Search (Shopping) Case (Magali, 2018), deciding that Google abused its market dominance by giving prominent placement in search results to its own comparison-shopping service while demoting rival services (Kokkoris, 2018). Since 2017, the EC has fined Google with €8.2 billion for anti-competitive practices; abusive practices in online advertising, the monopolistic market dominance of its Android operating system and for blocking advertising rivals in AdSense (EC, 2019).

Recently, in May 2020, the shares of the parent company Alphabet dropped by two per cent after the report that there would be antitrust charges by the United States Justice Department in the forthcoming summer.

Correspondence:
Nataša Krstić

e-mail:
natasa.krstic@fmk.edu.rs



The Department of Justice, which is also scrutinizing Google's ad technology, is focusing on how Google leverages its dominant search position to stifle competition.

Despite so many regulatory penalties for anti-competitive behaviour and intrusive privacy rules, "google it" has become a transitive verb (Merriam-Webster, n.d.) and Google (owned by Alphabet) is still over-dominant across the online ad ecosystem and as a search engine. In Serbia, Google holds 98.35% of the search market share, and globally 94% (Statcounter, n.d.). Only in China, South Korea, Russia and the Czech Republic, these numbers are lower. This clear monopoly comes not only from internet searches that go to Google (69.4%) but also from those routed to its platforms: Google Images (20.5%), YouTube (3%), Google My Business and Google Maps (0.8%) (Fishkin, 2019). Depending on the search query, Google News, Google Travel, Google Weather, Google Scholar might also steal some portion of web searches. Consequently, if Google's algorithm is biased toward its platforms, it is advisable for web administrators to position business presence on Google's own properties (Fishkin, 2018) thus helping Google to reach, harvest and understand a web presence (Askey & Arlitsch, 2014).

Search engines present search results according to a broad range of factors. Google is said to employ more than 250 factors in its ranking algorithm, most of which are being held as closely guarded secrets (Cheng-Jye, Sheng-An & Ting-Li, 2016). In order to understand the position of a website on the search engine, web administrators use in practice various search engine optimisation tools and software, aiming to simulate Google algorithms in order to understand the visibility, performance and authority of its website on the search engine. In that respect, search engine optimisation (SEO) is defined as the implementation of practices aimed at making the websites friendly to both humans and search engines, thus improving their visibility on the search engine results pages (Dickinson & Smit, 2015).

1.1. Search Engine Results Page (SERP)

The starting point of any internet search is the need, expressed through the intention of the internet users. Modern search engines can respond to user queries with relevant results that are displayed in a particular order or rank on the search engine results page (SERP). Depending on the type of the query, the SERP can present organic and paid website results, featured snippets, related searches and vertical results (such as Google My Business listing with its Google Maps location, Google News, YouTube videos, Google Knowledge graph) (Juon, Greiling & Buerkle, 2012).

Importantly enough, "the presentation of results on the SERPs heavily influences users' selection of certain results" (Höchstötter, & Lewandowski, 2009, p. 1796).

The results that are within the visible area ("above the fold"), without the need for the user to scroll down the SERP, are the ones which gain most of the clicks. Consequently, most users do not look beyond the first page of the search results, which means that if a website does not appear there, it loses visibility, and with it a good portion of web traffic (Pérez-Montoro & Codina, 2017).

In June 2019, a new paradigm occurred; over a half of browser-based searches on Google (50.3%) resulted in zero-clicks to websites (Fishkin, 2019). Specifically, Google tries to respond to search queries, especially those that come from mobile devices, without clicking on any results. In other word, Google is trying to serve users with a direct answer to their query directly on the SERP. As a result, searches without any clicks and clicks routed to Google-owned properties are steadily increasing (ibid). There has been a shift in Google's behaviour, from a search engine that drives searchers to websites to find answers to queries, to a self-hosted answering and solutions machine (Fishkin, 2018).

1.2. The importance of web presence for educational institutions

In the second decade of the 21st century, web presence became crucial for educational institutions, as a means of scholarly communication, a distance learning tool, an open forum for community engagement, and universal showcase for attracting talents. As a result, visitors achieve greater success and satisfaction while performing tasks on university websites that have strong web presences (Peker, Kucukozer-Cavdar & Cagiltay, 2016). In other words, the web presence for higher education institutions not only has a lead generation role, but it is also in the function of SERP branding. Brand SERPs are the set of results that a search engine shows to users when they search online using a brand's name as their keyword. Based on that, reviewing and improving the web presence of a higher education institution can serve as a catalyst to improve the transmission of messages about the mission, values, differentiators and strengths - making the educational experience in the institution trustworthy and unique.

For this reason, in addition to the traditional "Shanghai List", the "Webometric Ranking of World Universities" – the initiative of the Cybermetrics Lab research group of the Spanish National Research Council, has recently gained importance as well.

The Webometrics Ranking combines webometric (the volume of the web content: the number of web pages and files) with classic bibliometric indicators (visibility and impact of web publications per number of citations) for university web presence ranking, thus providing a mixed indicator of both academic and web presence excellency (Maasoumeh & Mohammad, 2019).



2. METHODOLOGY

The research methodology includes software screening and observation of Google search results on the SERP, on the sample consisting of eight private universities in Serbia: Singidunum, Megatrend, Privredna akademija, Metropolitan, Union, Union Nikola Tesla, Alfa and International University of Novi Pazar (NEAQA, 2020). The analysis included only private universities, as they are not beneficiaries of the state budget for education, which makes their online visibility and web presence one of the major contributing factors to the enrolment of a new generation of students.

Given the introductory considerations, from which it arises that Google, together with its owned platforms has absolute dominance in the search engine market, the following hypothesis was formulated: *University websites that have a presence on Google platforms have a better SEO score.*

The research aimed to detect whether Google favours its own platforms by providing websites that have optimised presence on them with better organic search visibility. The visibility of the websites in Google search is presented as a total SEO score, shown on a scale from 1 to 100 (with 1-40 signifying low performance, 41-69 with opportunities to improve, and over 70 being well optimised to both search engines and users) (Lucia, 2020). For its calculation, the SEO and website review tool Woorank has been deployed in May 2020. Woorank displays its SEO score given on any website evaluated, as a result of analysing key factors that impact SEO and visibility of a website.

When it comes to owned Google platforms, the following methodology was applied:

- Strategic presence on Google My Business (GMB): claimed or verified listing, confirmed by not showing the option "Claim this Business" or "Own this business" (Capper, 2019). It was presumed that universities, because of their authority and relevance in the education community, must verify their GMB listing as a legitimate business, thus preventing Google or

even competitors (Hawkins, 2017) from publishing out-of-date or inaccurate information. Also, unverified GMB listings are usually positioned lower in the search results compared to verified ones, which is why they have less visibility (Search Engine Journal, 2018a).

- Google Maps: owning a pinned location.
- YouTube: channel owned by the university.
- Google Images: ratio of images that do not contain an alternative description (alt-text) in the total number of website images, analysed by means of the Screaming Frog crawler software. Images without descriptive text will not be visible in Google Images search results (Baker, 2018). Because Google recommends that most, if not all images on a website be described (Illyes, 2018), in the conducted research the Google Images platform was categorised as good (up to 25% of images missing alt-text), tolerant (25-35% without alt-text) and poor performance (over 35% images with no alt-text).

For reciprocity, the data collected through software screening has been uploaded on the Mendeley data repository (DOI: 10.17632/s6wsftwkwd.1).

3. RESULTS

With the initial hypothesis in mind, the web presence of eight private universities on four relevant Google platforms was analysed. The universities that made up the sample were ranked first according to their SEO score, after which their presence on chosen Google platforms - Google My Business, Google Maps, YouTube and Google Images was shown, the last column displaying the number of Google platforms on which there is a web presence.

Table 1. Web presence of university websites on Google platforms

	URL	SEO score	Verified GMB	Pinned Google Map	YouTube channel	Google Images (missing alt text)	Number of Google platforms
1	Metropolitan.ac.rs	77 (good)	Yes	Yes	Yes	23.86% (good)	4
2	Singidunum.ac.rs	73 (good)	Yes	Yes	Yes	11.64% (good)	4
3	Alfa.edu.rs	69 (medium)	No	Yes	Yes	0.61% (good)	3
4	privrednaakademija.edu.rs	64 (medium)	No	No	Yes	35.12% (poor)	1
5	Unionnikolatesla.edu.rs	64 (medium)	No	Yes	No	94.29% (poor)	1
6	Megatrend.edu.rs	59 (medium)	No	Yes	Yes	57.78% (poor)	2
7	Uninp.edu.rs	55 (medium)	No	Yes	Yes	36.04% (poor)	2
8	Union.edu.rs	48 (medium)	No	No	No	42.11% (poor)	0

Source: Woorank (SEO score), Google SERP (Google My Business, Google Maps, YouTube), Google Images (Screaming Frog), 19-21 May 2020.



The conducted research indicates the following results:

- The benchmark universities per SEO score, Metropolitan and Singidunum, are present on all the analysed Google platforms. The verified Google My Business listing additionally boosts their SEO score as a signal of authority to Google (Allworth, 2020), which is particularly important for educational institutions. In this regard, it should be noted that Metropolitan has a fully verified GMB listing (without the option: "Own this business"), while Singidunum has a partially verified GMB listing (existence of the option: "Own this business", the possibility of external entry to the account, but access to it being denied by the web administrator the same day) (Google My Business Help, n.d.).
- Conversely, the university with the lowest SEO score, Union, does not have an optimized presence on any of the analysed Google platforms.
- A well-ranked follower according to the SEO score, Alfa, has a presence on three out of four Google platforms.
- Non-optimised images, which are consequently not present in Google Images search, contribute significantly to the SEO score of the analysed universities.

4. CONCLUSIONS

For decades, Google has been a force in the world of technology, society, and information quality, improving many aspects of people's lives around the globe. However, when it comes to building services outside of its core web search business, there is strong evidence that the company has leveraged its monopoly position in its attempt to compete in other sectors unfairly.

Based on the above findings, we can conclude that the synergy of several platforms provides better search visibility, expressed through the SEO score. And vice versa, universities without a presence on Google platforms turn to be low achievers in terms of the SEO score.

The interpretation of the results obtained in this way entails certain limitations. The most significant limitation is the fact that Google uses more than 250 factors in website ranking, and for a precise insight, the quality of optimisation of the analysed platforms should be considered. In particular, this refers to whether images are merely described or contribute to and strengthen the website keyword strategy, which makes them relevant to search queries. Furthermore, it is also relevant how many subscribers YouTube channels have, and how well the accounts themselves are optimized. For Google My Business listings, the number and quality of user reviews are important as well. And last but not the least, it should be taken into account how technically superior university websites are and what is their authority, expressed by the quality of backlinks and number of referrals.

However, since the topic of the paper was not the excellence of the SEO optimisation, but whether Google algorithm is favouring its platforms in search visibility, it can be concluded that the starting hypothesis was confirmed, having in mind that the best-ranked universities are present on all of the analysed Google platforms, which positively impacts their search visibility.

The identified limitations also provide recommendations for future research, which may include considering the authority of university websites by analysing their backlink structure and quality or the impact of their social networks in the period preceding the enrolment of a new generation of students.

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RELEVANCE OF SOCIAL MEDIA IN CORPORATE WORLD

Marko Pavićević^{1*},
Avetik Pashayan²,
Mohammad Razaul Karim³

¹Singidunum University,
Belgrade, Serbia

²National University of Architecture
and Construction of Armenia,
Yerevan, Armenia

³Comilla University,
Cumilla, Bangladesh

Abstract:

Social media is becoming increasingly relevant for corporate businesses. It is becoming increasingly relevant part of everyday life for overall population. It creates virtual communities that are very important for corporations in order to adjust to market tendencies. Great advantage of social media for corporations is being able to promote their business in a more efficient way, creating virtual communities that can help establish close connection with clients and to create a narrative that can bring benefit. Opportunity for companies via social media is creating long lasting bond with customers that can constantly be improved and moderated for the sake of everyone's interest. Furthermore, social media, today, is an important factor in recruiting new employees. Interactive way of communicating is another milestone where companies can attract clients, maintain good relations, and create promotions that are much more creative in nature.

Keywords:

social media, communication, marketing, virtual communities, business strategy.

1. INTRODUCTION

Digital era is the new reality for which we are never really sure where it will lead us. Certainly, one legitimate argument is that corporate functioning will be impossible without the Internet and social media. One of the great advantages of digital era is that communication will be much easier between corporations and clients. Management of vast information will be the challenge. Furthermore, it is very difficult to imagine that an individual does not have at least one profile on social media. This means it is crucial for corporations to be present online in order to connect with its customers and potential clients.

Social media is a term for web pages and applications whose aim is to create communication and interaction between people. "Social media employ mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content" (Kietzmann, Hermkens, McCarthy & Silvestere 2011, p. 241). Creation of virtual community is the goal of social media. This virtual community is an opportunity for companies to attract customers and to promote its products and services. One of the aims of social media, also, is transparency where companies can be fully transparent in their intentions, problems, ideas, visions and etc. Furthermore, participation is another advantage where companies can allow customers to be a part of corporate vision through their personal input.

Global connections and being part of virtual reality is tendency that corporation can use in order to take a full advantage that social media provides. For companies, social media is relevant because it is becoming incorporated in all parts of public life (Dijck & Poell, 2013).

Correspondence:
Marko Pavićević

e-mail:
marko.pavicevic@singidunum.ac.rs



This research paper will analyze importance of social media in corporate world. Firstly, it will analyze advantages that social media provides for corporations. Secondly, it will analyze opportunities that social media brings to corporation. Thirdly, it will explain the role of social media in everyday corporate life. Fourthly, paper will analyze connection between social media and corporate communication. Finally, there will be analysis of the relevance of social media for corporate marketing.

2. ADVATAGES OF SOCIAL MEDIA FOR CORPORATIONS

There are three reasons for corporations choosing to use social media for corporate business: overall promotion of their business, forming a narrative or in other words, creating virtual community and to the extend, bigger audience and reaching more potential customers (Carim & Warwick, 2013). Brand awareness is one the most important factors for the success of the company. New customers and young generations claim that they learn about new companies through the Internet and social media. This trend is an absolute necessity for companies to follow and to make sure they persist with it. Furthermore, in the world where companies, usually, have negative image of being completely profit oriented, social media have the role of creating trust within customers, which leads to brand humanization through promotion of social values that are important to them. For example, the company can promote itself as the defender of global warming. In that way, it can attract customers with the same ideals and tendencies. Also, constant interaction with clients is practically impossible without social media. Social media transcends borders, language barriers, time barriers and allows companies and customers to have connection at any given time of the day. Official sites are, still, most important factor for company in terms of information gathering. Nevertheless, social media sites increase clients and potential client's presence at the official company's site. Goal is to attract clients and link social media information to the official site of the company. Free promotion is, probably, the greatest advantage of social media that can serve as a promotion partner in connecting company with potential clients. This can lead to an increase in sales because every new contact at social media can be a potential buyer that brings benefit to the company.

Social media contributes to 'two-way street' communication in corporate world, which can be extended between different parties. Furthermore, we cannot control communication at social media because there are different inputs by many users. Also, social media creates tendency for coordinated tendencies, but it lacks coordination of those tendencies (Lee, Oh & Kim, 2013).

This two-way street communication provides a negative and positive view of a company. Clients can express their opinion and company will get the input that can be used in order to improve its practices and to satisfy customer needs and tendencies. Downside is that tendencies at social media are not controllable, but on the other hand, they provide the company with ability to react in time of crisis. For example, social media can help the company to connect fast with clients and to publicly apologize for malpractice. Also, it is true that social media creates desire to form a coordinated strategy, but because of its nature, it is difficult to have one. Nevertheless, there can be a part of coordinated strategy, aimed at satisfying customer needs, such as customer support where clients can always get relevant information from companies.

Competition has been, and always will be, obsession for companies. Every company wants to have information about other companies' tendencies, goals, visions, in other words, secrets that can be used with the aim of improving its own position. Since social media bring transparency, it is easier for companies to gather information about each other. Also, it is easier to get information about what customers think about competition. All this, gives possibility for companies to adapt, change and to improve its practices for the sake of attracting more customers. We live in a very dynamic world where it is very easy to miss information that can be relevant for success of a company. Corporations, in increasingly digital world, cannot afford to miss information that can be crucial for the success of a business. Lastly, huge advantage of social media for companies is targeted promotion. Companies can promote their business with the help of target groups that are based on geographic and demographic bases. For example, it can make a different add for clients that are above sixty years old and add for clients that are younger, which is based on generational tendencies.

3. OPPORTUNITIES SOCIAL MEDIA PROVIDES FOR CORPORATIONS

Social media, above all, gives opportunity to corporations to create long lasting relationships with the general public. This visibility helps corporations increase their presence in the media, create trust and improve positive perception of their products and services. Social media helps corporations analyze how much general public talks about them and what is the perception of them. Greater presence at social media brings greater attention, which means there is greater brand recognition and loyalty (Yang & Kent, 2014). Brand psychology argue that the brand value is in the perception of another person. We need to understand human mind in order to create valuable brand.



Social media help companies gather information about those perceptions, which help them take directions, necessary to improve their brand value.

Social media allows companies to use pictures in order to create better relationship with customers and to promote its products and services in a more vivid way. Visual approach to promotion and communication creates better understanding of corporate culture and vision, which creates better experience for customers. Picture is worth thousand words, which means there is visual approach that enhances and improves interactions with customers. Furthermore, people, by their nature, love interaction and to be able to answer questions. Social media provides opportunity for customers and potential customers to directly ask a company about issues that relate to them. When we are able to ask question, we feel respected and valued. Companies can show their appreciation by being constantly available to customers at social media. Surveys are another example of relevant way of finding out what customers think, want and like. They stimulate interests, provide information and require questions that result in important information for companies and their businesses.

Traditional research is very important for companies to improve their business practices and enhance overall efficiency of their business strategy. Accordingly, digital research is becoming more relevant in corporate world, where companies can create interesting research patterns in order to attract clients as another way of getting to know them. Social media brings openness, which means it makes an opportunity for creating emotions that are subtle way to attract customer. For example, company can make fun of its own products and service, which will attract customers and their curiosity. Furthermore, people like facts and statistics, which means they want tangible data on the matter that is in their interest. Every sharing of facts makes people more informed and more interested in a particular company. For example, Starbuck can share online their new strategy of recycling that will make our planet cleaner. Customers who are environmentalist can identify with that strategy. In other words, “by making social media and intricate part of the marketing and sales strategy, companies could develop deeper relationship with customers, increase collaboration via two-way conversation, gain incredible customer insight, and as a result, achieve true 360-degree view of their customer, all while continuity to profit” (Rodriguez, Peterson & Krishnan 2012, p. 376).

4. ROLE OF SOCIAL MEDIA FOR CORPORATIONS

For corporations, hiring process and attracting appropriate candidates for the job is imperative for future success. Human resource managers rely on social media to attract and find potential candidates for the job. It gives opportunity to companies to do research on potential candidates for the job. For example, company can see communication skills of potential candidate, necessary for the specific job. Furthermore, company is able to pay attention, through social media, whether an employee is behaving according to company norms and values. For example, if company has very strict feminist values, it can check if their employees respect women and does not insult them on social media. Simultaneously, it can validate whether employee is telling the truth. Employee can argue that his absence is because of the illness and company can validate that claim online, through social media, whether he is really sick, or he went for vacation abroad. Above all, social media is very important tool for companies to plan and promote events. There is a saying “if it did not happen on Facebook, it did not happen at all in reality “. Social media and virtual world became relevant to the companies and their business practices as much as the real world. Universities can use social media for promotion and for targeting particular groups that are relevant. Firstly, universities can use social media to share important news that are relevant for students. Secondly, universities can use social media to stimulate debate between the students and that information can be used latter to improve its practices (Belanger, Bali & Longden, 2013). Situation with SARS-CoV-2 virus showed us how relevant social media is for the functioning of universities. Most effective way for students to get information and to talk between themselves how university will continue with its practices was through social media.

Public relation is crucial factor for companies to maintain good relationship with clients and partners. For example, LinkedIn is a professional platform that allows companies to maintain good professional relationship with clients and partners. For example, university can organize academic conferences and invite all participants through social media. Simultaneously, it can redirect online users by creating links between companies' web sites and personal accounts. All of the above, would be impossible without local research. Social media provides companies with tools to analyze market tendencies and to adjust accordingly. If the overall public tendency is more toward eco-friendly environment, companies can adjust their products and services and the potential clients can identify with the company. It is all about anticipation and making sure to create prospect for the business.



Social media provides better communication with clients, which can help company forecast the business tendencies in the market. Company needs to carefully plan its strategy at social media. Proper employees, mostly millennials, work in this area of business. Traditional marketing and the use of social media need to be synchronized for the sake of successful business practices (Sodeman & Gibson, 2015). Modern technology is always rejected at first because of contemporary tendencies of doing business. Companies will be more successful if they embrace new technologies being offered to them, while maintaining their values and goals.

5. SOCIAL MEDIA AND CORPORATE COMMUNICATION

Regarding communication, social media has helped companies build interactive approach with their customers and partners, rather than just sharing important information. This means that both sides can express their desires, frustrations, and tendencies, which is a huge opportunity for companies to adjust to market tendencies (Cho, Furey & Mohr, 2016). In other words, power of social media is the listening that gives opportunity to corporations to analyze people's tendencies in a different communities and groups. This will provide knowledge of trends, problems and challenges that can help companies identify potential clients. All this knowledge gives opportunity for companies to create particular content for particular group. For example, if there is a feminist movement among young generation, company can create programs for young female leaders to follow that trend. It is an imperative for the whole corporate team to synchronize its communication system with social media, which will enable them to be available at any time for any issue necessary. A company, firstly, needs to educate the public, through social media, with its values and visions before the promotion of its products and services. Furthermore, visual appearance is another milestone in social media where companies can share, not just pictures, but videos that provide more vivid experience for customers. People are visualists and it is more likely that they will remember the company if they live through experience. For example, Starbucks celebrated the month of "Pride" in the United States by giving support to LGBT population. Company shared many pictures, videos and made research that stimulated debate and presence online. In this way, company communicated with their customers and created a bond that will reaffirm brand's value. Final aim of communication through social media is creating emotion in people that affects and attracts clients.

Research argues that companies, rarely, have a strategic approach at social media, rather they improvise and experiment on ad hoc basis. Furthermore, there is no clear goal, which is integrated with corporate vision. Above all, problem is that, usually, corporate communication is not integrated with social media communication (Macnamara & Zerfass, 2012). Firstly, it is necessary for the company to make constant experiments with social media. For example, company Netflix in time of pandemic, organized conferences where people can connect with experts and ask about their problems and about virus in general. Secondly, company needs to constantly distribute its promotional material online. Clients need to be constantly informed about companies' new products, services and tendencies. For example, Lego company shares its new prototypes on YouTube for clients to see and to get feedback from them. Thirdly, companies need to share same content on different social media. There is a need for different approach at different social media platforms and that is why companies need to synchronize their vision and business practices in order to be able to share it. Fourthly, consistency of the message is imperative for companies to create one unified vision and share it online. If one company fights against discrimination among people, it needs to promote itself in this way on every social media platform and to provide an example in reality.

6. RELEVANCE OF SOCIAL MEDIA FOR CORPORATE MARKETING

For social media corporate marketing to be successful, company needs web site that is effective, integrated and to express corporate vision, orientation, goal and etc. Furthermore, marketing team need to be very knowledgeable and able to synchronize traditional market and digital marketing. Synchronization between traditional and digital market is important because it gives full experience to customers, who can use social media to follow company claims, trends and services. Digital marketing through social media is not independent strategy, rather a toll that accompanies overall corporate marketing strategy (Constantinides, 2014). Nevertheless, there are many important reasons, why company should use social media in order to improve its marketing strategy. Above all, social media can help companies improve their brand image, which is essential for the success of the company. Company Domino allow their clients to create their own pizza flavor online. In this way, they create an image of the company that is open minded and ready to adjust to clients' needs and tendencies. Additionally, social media can reduce costs when it comes to marketing. Many online platforms allow for free promotion, which in turn, can allow companies to diversify and to reduce cost of traditional marketing.



For example, direct relation with the clients, reduces costs for traditional way of communicating and promoting. Companies do not need to pay phone bills or to print promotional materials when they can do that online through social media platforms.

Being informed and having knowledge is imperative for companies to be successful and to adjust their strategies. Being present on Internet with the help of social media, companies can gather knowledge of different trends, tendencies and etc. This gives them power to adjust their business practices and to provide products and services that will make potential clients interested. Likewise, this provides companies with bigger range in the market. With the help of social media, companies can transcend geographic and demographic barriers and act accordingly. Furthermore, social media allows companies to follow their peers and their tendencies and business practices, which can help them with their strategy. Overall, there is a great power in being informed through social media that help companies promote their vision and constantly adapt. Aim of viral marketing is creating online communities of similar interests that will remain loyal to the brand. Companies do not just promote their products online, they bring people together who strive for similar products to discuss and share experience. It is difficult to measure success of marketing through social media. Companies need to focus on qualitative, rather than quantitative approach to measuring effectiveness of viral marketing (Miller & Lammas, 2010). Aim is to think outside of box and traditional way of doing marketing. Companies need to develop online communities, to bring people together and to be creative in order for them to materialize from social media and viral marketing.

7. CONCLUSION

In the present and near future, it would be impossible for companies to do business and to be successful if they are not present on different social media platforms. In the long term, our whole lives will be digitalized and accordingly, companies need to adjust their visions, goals, and business practices. Social media provides opportunity for companies to achieve interactive communication and ability to respond in efficient way so that customers are satisfied. Furthermore, it gives the ability to keep an eye on competition, more importantly, to gather knowledge of what clients think of competition. Role that social media has, such as paying close attention to employees and establishing appropriate public relation is imperative for the success of the companies and staying updated with relevant information. Above all, social media gives power to customers to express their desires, wishes and frustrations, which is, in fact, a huge benefit for companies to be able to adjust accordingly to those tendencies. Lastly, social media contributed to viral marketing, in other words, it can make traditional marketing more successful.

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LEADERSHIP IN VIRTUAL TEAMS

Ana Radulović^{1*},
Olga Epitropaki²

¹Singidunum University,
Belgrade, Serbia

²Durham University,
Durham, UK

Abstract:

Rapid technological advancements and process automation have enabled organizations to manage their work across time and space, that is, to create virtual teams. In the paper we differentiate between leadership in traditional and virtual work contexts. Additionally, we outline the challenges that leaders of virtual teams face. Furthermore, we identify transformational and transactional leadership styles as the two most impactful hierarchical leadership styles and outline their outcomes in virtual teams. Moreover, we outline the outcomes of shared leadership in virtual teams. Lastly, we summarize the impacts of research on leadership in virtual teams.

Keywords:

leadership, virtual teams, transformational, transactional, shared.

1. INTRODUCTION

Fast technological developments and process automation have enabled organizations to conduct their work across time and space. As a consequence, numerous communication technologies used in the virtual working environment have provided a new context for leadership and teamwork. Leadership is defined as a process by which individuals use their intentional influence to guide, structure, and facilitate activities and relationships in groups or organizations (Yukl, 2010). Indeed, leaders are expected to encourage, motivate, and manage subordinates' performance mostly through their physical presence. Due to the changes in the work context, virtual leadership has been conceptualized as a process of social influence that is enabled by advanced information technologies to generate changes in organizations, groups and individuals regarding their performance, behaviors, thinking and attitudes (Avolio, Kahai, & Dodge, 2000). Recently, the COVID-19 pandemic has intensified the need for leaders to ensure effectiveness of their remote teams (Bartsch, Weber, Büttgen, & Huber, 2020; Feitosa & Salas, 2020). Therefore, leadership in virtual teams is relevant more than ever before.

Teams represent groups of individuals who work on interdependent tasks; they are mutually responsible for team performance and are perceived as a social entity (Cohen & Bailey, 1997). Teamwork has also been affected by the virtual context and new technologies that facilitate their functioning. Therefore, virtual teams are defined as symbiotic groups of individuals whose communication heavily depends on advanced information technologies which enable them to operate beyond time, space and organizational limitations (Hambley, O'Neill, & Kline, 2007). These types of work units are becoming increasingly common in many organizations.

Correspondence:
Ana Radulović

e-mail:
aradulovic@singidunum.ac.rs



They enable organizations to enhance their productivity by minimizing operational costs and by allocating tasks to the most appropriate human resource (Huang, Kahai, & Jestice, 2010).

Extensive reliance on technology can impede communication in virtual teams and cause confusion regarding the progress of their work. Indeed, the absence of face-to-face interaction can limit a leader's ability to provide guidance, feedback and perform other functions (Hambley et al., 2007). Members of virtual teams often experience a low level of team cohesion and trust, especially if they did not interact previously. Furthermore, virtual team members tend to have different backgrounds and thus different norms and procedures for completing work. Moreover, physical separation of team members can lessen the significance of the team and its objectives (Hambley et al., 2007). Considering the challenges of virtual environment, an important question is what leadership style is the most appropriate for virtual teams. This topic has been the focus of numerous empirical studies. Scholars have referred to virtual leadership as *formal or hierarchical leadership* by which one person assumes the role of a leader within the group and as *shared leadership* by which the leadership role is shared among its members. In this paper we identified three most prominent leadership styles in the literature on virtual teams, namely transformational, transactional and shared leadership. Additionally, we review the impact of these leadership styles on the outcomes of virtual teams. Lastly, we outline the implications of leadership in virtual teams.

2. TRANSFORMATIONAL AND TRANSACTIONAL LEADERSHIP

Transformational leadership is a process by which leaders inspire followers to accept and pursue leader's vision and motivate them to transcend their own self-interest for the sake of the group interests (Bass, 1985). As a multidimensional construct, transformational leadership involves four dimensions; idealized influence, inspirational motivation, intellectual stimulation and individualized consideration (Bass & Avolio, 1993). Each of these dimensions significantly impacts followers' experience of the leadership process.

Idealized influence or charisma is the emotional component of leadership. Charismatic leaders represent role models for their followers who easily identify with them. These leaders demonstrate high standards of moral and ethical conduct which their subordinates aim to emulate. Charismatic leaders articulate attractive vision and mission for their subordinates. *Inspirational motivation* entails communicating high expectations to followers. Leaders inspire their subordinates through motivation to pursue

organizational vision. Furthermore, leaders enable group members to achieve more than they would do on their own with the use of symbols and emotional appeals. In doing so, inspirational leaders strengthen team spirit.

Intellectual stimulation involves leadership that encourages followers to be creative and innovative. Leaders challenge assumptions, including their own, subordinates' and organization's values and beliefs. Followers are encouraged to try new approaches to addressing organizational issues. Furthermore, free expression of thought and creative problem solving is encouraged. Lastly, *individualized consideration* enables leaders to create a supportive climate in which they cater for followers' individual needs, abilities and aspirations. Leaders aim to fully develop followers' potential by providing guidance, coaching and mentoring (Bass, 1985; Yukl, 2010).

In contrast, transactional leadership involves a process of exchange with followers that generates mutual benefits (Bass & Avolio, 1993). The power of transactional leaders lies in the fact that followers will be rewarded if they do what the leader wants. In a similar vein, followers comply with leaders' expectations to avoid punishments. Transactional leadership is based on two factors: contingent reward and management by exception.

Contingent reward implies that followers' efforts are exchanged for specific rewards. This approach to leadership enables leaders to gain follower's agreement on what needs to be achieved and benefits for people who achieve it. *Management-by-exception* involves leadership that utilizes negative criticism, negative feedback and negative reinforcement when subordinates underperform. A transactional leader will therefore offer prizes, praise, compliments, and rewards when objectives are achieved. Team processes are facilitated by providing clarifications of roles and task expectations which are then reinforced through contingent rewards. In contrast, when subordinates fail to achieve outlined objectives, a transactional leader uses negative reinforcements such as punishments (Bass, 1998).

Transformational and transactional approaches to leadership have attracted attention of numerous studies over the last decade. Interestingly, transformational leadership was found to be more effective than transactional leadership (Bass, 1997; Judge & Piccolo, 2004). While transactional leadership focuses on expected results, transformational leadership focuses on performance that exceeds what is expected. The results of meta-analysis showed that transformational leadership, rather than transactional leadership, had a greater impact on followers' job satisfaction, satisfaction with leader, motivation, leader performance, effectiveness, and group/organization performance (Judge & Piccolo, 2004). Transformational leadership is also relevant in virtual teams whose members



face the challenge of being in different geographical locations and time zones. The following section outlines the impact of transformational and transactional leadership styles on various aspects of virtual and traditional teams.

3. THE OUTCOMES OF TRANSFORMATIONAL AND TRANSACTIONAL LEADERSHIP IN VIRTUAL TEAMS

Several studies investigated the impact of transformational and transactional leadership on virtual teams. One study, in particular, examined the level of team-members' satisfaction and perception of the leadership style. Findings suggested that virtual team members were more satisfied with a transformational leadership style than with a transactional style. Additionally, team members preferred transformational leadership over transactional leadership (Ruggieri, 2009).

Another study involved employees working in virtual teams in a Fortune 500 hardware and software multinational corporation. It was found that inspirational leadership significantly influenced team members' trust and commitment to the team. Furthermore, the positive association between inspirational leadership and employees' trust and commitment was stronger in teams that were more dispersed. While inspirational leadership is vital for all working environments, its relevance is particularly highlighted in virtual teams or highly dispersed work contexts (Joshi, Lazarova, & Liao, 2009).

Researchers examined the link between personality aspects and transformational leadership emergence by comparing virtual teams with face-to-face teams. The results demonstrated that extraversion and emotional stability contributed to transformational leadership emergence in face-to-face teams. Interestingly, the linguistic quality of virtual team members' written communication triggered transformational leadership emergence in virtual teams (Balthazard, Waldman, & Warren, 2009).

In a similar vein, another study examined transformational leadership by comparing traditional teams that used face-to-face communication with virtual teams that relied on computer-mediated communication. The study involved thirty-nine leaders who supervised both types of teams. The results showed that the most effective leaders were the ones who enhanced their transformational leadership in virtual teams. Interestingly, team-level analysis showed that transformational leadership had a greater effect on team performance in virtual teams rather than on performance in traditional teams. Furthermore, team members' evaluation of transformational leadership was equally associated with project satisfaction in both traditional and virtual teams.

Overall, the findings suggested that transformational leadership had a greater impact on teams that relied on computer-mediated communication only. Leaders who enhanced their transformational leadership behaviors in virtual teams attained greater team performance (Purvanova & Bono, 2009).

Cooperative climate involves the common impression of the members that the team provides them with support and safety as they strive to achieve their objectives (Chen & Huang, 2007). Team cohesion is a dynamic feature of a team that reflects a group's tendency to remain in a group (Festinger, 1950). Members are motivated to remain a part of the group because of interpersonal attraction (i.e., social cohesion) and shared commitment to the group task (i.e., task cohesion, Hackman, 1987). A medium's richness is rooted in its ability to deliver several cues, immediate feedback, language variety and personalization (Daft & Lengel, 1986). The richest media is face-to-face communication, which is followed by telephone, chat, e-mail, and print communication (Webster & Hackley, 1997). The findings of another study suggest that transactional leadership enhanced team task cohesion, while transformational leadership enhanced cooperative climate. Cooperative climate, subsequently, enhanced task cohesion. Nevertheless, the impact of leadership style is contingent on media richness, as it unfolds only when media richness is low (Huang et al., 2010).

More recently, a study investigated the challenges that virtual team leaders face. In particular, the study examined how transformational leaders may develop high-quality relationships with their remote subordinates considering team task interdependence and electronic dependence (Wong & Berntzen, 2019). The results showed that transformational leadership was negatively associated with relationship quality when teams were high in both task interdependence and electronic dependence. Therefore, the study indicates that transformational leadership may not always be effective in virtual teams (Wong & Berntzen, 2019). Therefore, future studies should explore other leadership styles appropriate for virtual teams.

4. SHARED LEADERSHIP

Another approach to leadership that has been shown to be effective in virtual teams is shared leadership. Shared leadership is a process by which all team members are completely involved in leading the team. That is, shared leadership encourages a simultaneous, ongoing and mutual influence of team members by which every member has an opportunity to emerge as an official or unofficial leader of the team (Pearce & Manz, 2005). Empirical studies of shared leadership include top management teams, change management teams, sales teams, and extreme action teams (Muethel & Hoegl, 2010).



Shared team leadership is argued to encourage the creation of stronger bonds between the team members, commitment, cohesion and trust, and lessen the shortcomings of virtual teams. Indeed, when team members share leadership function, they balance hierarchical leadership in virtual teams (Hoch & Kozlowski, 2014). Communication in virtual teams is less formal and less hierarchical and, thus, team members are more likely to overcome communication obstacles. Likewise, virtual team members work on the cognitively demanding tasks that are vastly interdependent, yet autonomous. Therefore, shared leadership is viewed as more suitable approach to leading teams than hierarchical leadership in which one person dominates (Hoch & Kozlowski, 2014).

5. THE OUTCOMES OF SHARED LEADERSHIP IN VIRTUAL TEAMS

Scholars have recently begun to investigate shared leadership in virtual teams. A study that examined 96 virtual teams showed that shared leadership encourages team performance (Muethel, Gehrlein, & Hoegl, 2012). Additionally, it was found that the structure of virtual teams enhanced shared leadership.

A study of 44 virtual teams investigated the extent to which shared leadership, autonomy and team members' trust influenced satisfaction of team members (Robert Jr & You, 2018). It was revealed that shared leadership enabled satisfaction in virtual teams both directly and indirectly through the promotion of trust. Namely, shared leadership moderated the effects of individual autonomy and individual trust on satisfaction. Satisfaction within the team significantly influenced performance of the team (Robert Jr & You, 2018).

Another study involving 101 virtual teams investigated the effect of traditional hierarchical leadership and shared team leadership on team performance. It was expected that shared leadership, rather than hierarchical leadership, would have a greater impact on team performance when teams were more virtual. Indeed, the results showed that the degree of team virtuality lessened the association between hierarchical leadership and team performance. Nevertheless, shared team leadership was associated with team performance irrespective of their virtuality (Hoch & Kozlowski, 2014).

6. CONCLUSION

The pervasiveness of technological advancements has enabled employees to work in teams from any place at any time. Nevertheless, this geographical dispersion may have a negative impact on the members of virtual teams, especially on their trust, commitment, and satisfaction. Furthermore, leaders may find it more difficult to ensure the optimal levels of cohesion, climate and performance in virtual teams. It was found that virtual team members preferred transformational over transactional leadership style (Ruggieri, 2009). Likewise, inspirational leadership is particularly relevant for dispersed work contexts (Joshi et al., 2009), although high electronic dependence and task interdependence could inhibit the development of high-quality relationships between a leader and subordinates (Wong & Berntzen, 2019). Moreover, scholars compared the impact of transformational leadership on both traditional and virtual teams. The results showed that transformational leadership had a greater impact on performance of virtual teams than on performance of traditional teams (Purvanova & Bono, 2009). While transformational leadership is considered to be a formal or hierarchical leadership style appropriate for both traditional and virtual teams, research has recently shown that shared leadership is particularly relevant for virtual teams. Namely, shared leadership contributed to the satisfaction (Robert Jr & You, 2018) and performance (Muethel et al., 2012) of virtual teams. It was also found that shared team leadership contributed to the team performance regardless of the extent to which teams were virtual (Hoch & Kozlowski, 2014). Future research should continue to investigate the ways in which hierarchical and shared leadership styles could have positive impact on virtual teams.

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EMPLOYEE MOTIVATION IN THE PROCESS OF MANAGING ORGANIZATIONAL CHANGE

Tijana Radojević^{1*},
Tanja Stanković²,
Danica Rajin³

¹Singidunum University,
Belgrade, Serbia

²IRM Bor,
Bor, Serbia

³FEFA,
Belgrade, Serbia

Abstract:

The organizational changes on which the development of each organization is based depend on numerous factors and assumptions, but one of the most important is employee motivation. In this context, employee motivation is one of the crucial phases of the organizational change management process. Without successful motivation, all activities of this process lose their meaning and cannot be successfully implemented. This is the reason that employee motivation is increasingly in the focus of the theory and practice of organizational change management, as well as in the focus of consideration in this paper. The aim of this paper is the employee motivation in the process of managing organizational change. Specifically, the paper considers various aspects of motivation for organizational change as part of the organizational change management process.

Keywords:

employee motivation, organizational change, human resource management.

1. INTRODUCTION

Organizational changes are complex phenomena on which the development of each organization is based. They imply a series of different processes, procedures and events that need to be managed depending on many factors, but above all on their type and specificity.

Among organizational changes, the most complex are organizational transformations that imply and have many different aspects, of which the following stand out:

- Reengineering,
- Restructuring,
- Total quality management,
- Knowledge management programs,
- Customer relationship management programs,
- Innovation programs,
- Culture change programs and
- Learning programs (Grubić, 2011).

The transformation of the company, in contrast to the development of the organization, which is related to minor development changes, is related to radical revolutionary changes in the company. These are changes that affect the company as a whole, which are usually implemented in a relatively short period of time and lead to new organizational parts.

Today, in accordance with the turbulent environment, a continuous transformation of the company is necessary, which implies directing the organization towards high growth, large and significant changes.

Correspondence:
Tijana Radojević

e-mail:
tradojevic@singidunum.ac.rs



In that context, change management is even more complex, and it is called transformational leadership, and if it is proactive, it leads to fundamental positive changes in the company (Džamić, 2016).

2. MOTIVATION IN THE ORGANIZATIONAL CHANGE MANAGEMENT PROCESS

Motivation in general is a force within a person that conditions certain instrumental actions in order to achieve set goals. Motivation from the point of view of members of an organization, i.e. employees, is seen by many authors as a process of satisfying individual needs which implies the following six steps (Cvetković, 2014):

- 1) Unmet need,
- 2) Tension,
- 3) Action,
- 4) Search,
- 5) Satisfaction of need,
- 6) Reduction of tension.

It is evident that unmet needs create stress and tension that drive action, and it further leads people to look for a way to achieve a goal that will meet their needs. This ultimately reduces the initial tension. From this model of the motivation process, it can be concluded that employees are always in a state of tension, and in order to get rid of that tension, they make efforts to meet the needs and reduce tension (Cvetković, 2014).

Motivation is especially important in the process of managing organizational change. In this context, the motivation of management and individual leaders is important, as well as the motivation of all members of the organization, i.e. employees.

One without the other does not lead to a successful change. This means that neither a motivated manager can make a change without motivated members of the organization, nor

can motivated employees significantly contribute to a successful organizational change without a motivated manager.

Motivating employees and effective communication are closely linked to the effective implementation of organizational change. Factors of individual motivation include job satisfaction, an atmosphere of fairness, and organizational commitment. These factors are primarily realized through a work environment that is strongly influenced by organizational leaders. Leadership is deeply connected to the internal motivation systems of individuals. Therefore, the ability of a leader to cultivate a work environment that increases employee motivation proves to be a critical condition for the successful implementation of organizational change (Gilley, Gilley & McMillan, 2009).

3. MOTIVATION FOR CHANGE AND HUMAN RESOURCE MANAGEMENT

Human resource management is a very special segment of the organization's management that is in specific relationships with other segments of the organization, starting from business strategy, change strategy, through all other strategies, all the way to employee motivation for both work and organizational change.

In the context of organizational change, human resources are the basis and the most important support for all changes. Every member of the organization is equally important in this context, whether they are change strategists, implementers or recipients of change.

Human resource management activities are conditioned by numerous organizational factors, and certainly depend on the types of organizational changes. The following is an overview of human resource management activities, as well as their advantages and disadvantages, depending on the three specific types of changes in the organization (Table 1).

Table 1. Types of organizational change and human resource activities

Type of change	Human resource activities	Advantages	Disadvantages
Education and employee involvement	<ul style="list-style-type: none"> • management development • employee training • quality group programs • joint consultations • teamwork and communication • employee counseling 	<ul style="list-style-type: none"> • a greater sense of employee involvement • getting fresh ideas • longer-term change 	<ul style="list-style-type: none"> • lasts long • slow process • expensive • resistance may arise due to a negative attitude towards change
Workforce fluctuation	<ul style="list-style-type: none"> • business interruptions • redundancy programs • recruitment and selection 	<ul style="list-style-type: none"> • significant impact • speed 	<ul style="list-style-type: none"> • dealing with negative consequences for employees • probably an expensive process
Changes in structures and systems	<ul style="list-style-type: none"> • changes in the organizational structure and responsibilities of employees • changes in the reward system • changes in the promotion system 	<ul style="list-style-type: none"> • longer-term change • renewal of knowledge and skills in employees • restoration of obsolete systems 	<ul style="list-style-type: none"> • slower impact • it can be difficult to establish a direct impact between these changes and changes across the enterprise

Source: Dženopoljac, 2008.



Of all human resource management activities, human resource planning most significantly depends on certain types of organizational change. The approach to human

resource planning is different from the “status quo” situation in the organization, depending on whether the organizational change is planned or unplanned (Table 2).

Table 2: Types of organizational change and human resource planning

Type of change	Approaches in human resource planning	Strategic selection of employees	Selection criteria
Status quo	Providing manpower for existing jobs	Selection based on short-term expertise; the possibility of dismissal if the employee cannot fit	Operational criterion: attributes required for successful performance of work in the workplace (knowledge, skills, interpersonal skills, values)
Planned /anticipated change	Providing manpower for projected future jobs	Selection based on the longer-term ability to accept change, but taking into account the risk that employees will not understand the change due to limited knowledge of the same	Visionary criterion: attributes that will hypothetically be required in new jobs
Not planned / no anticipated change	Providing manpower for jobs that cannot be described in advance	Follow the path of constant modification in the future, with numerous changes in employee selection systems	Transformation criterion: attributes required to initiate change; competencies for change; rather than variable competencies

Source: Dženopoljac, 2008.

In addition to the previously described relations between human resource management and organizational change, in the context of this paper, a significant link between human resource management and employee motivation for organizational change should be highlighted. Among the human resource management activities that most significantly affect employee motivation for organizational change are employee development and reward.

Employee development implies adequate conditions for learning during work with the aim of successful business operations of the company. It should be emphasized that the training of employees should be harmonized with the needs and goals of the company. In practice, the development of managers and employees is realized through various forms of acquiring new knowledge and skills.

Rewarding employees, which is carried out as an activity within human resource management, is a very important (but not sufficient) motivating factor for accepting organizational change by employees. It is important that the values on which a good reward system should be based are:

- justice,
- payment for performance,
- financial and non-financial rewards,
- Involvement of employees in the formation of the reward system (Dženopoljac, 2008).

4. EMPLOYEE MOTIVATION - IRM BOR

Practical research within this paper was conducted by applying data collection methods through interviews, surveys and observations as well as analyzing the content of relevant sites, legal regulations, reports and regulations.

The Institute of Mining and Metallurgy Bor (IRM) is a scientific research institution that operates in accordance with the following basic legal acts: The Law on Scientific Research, the Rulebook on the Procedure and Manner of Evaluation and Quantitative Expression of Scientific Research Results and the Rulebook on election to professional titles. The activities of the institute take place within ten organizational units: Office of the Director, Strategic Projects, Department of Legal and Economic Affairs, Integrated Management Systems, Center for Design of Metallic Minerals, Center MEGA, Center for Development Technologies in Metallurgy, Center for Laboratories, Center for science and the Center for Electronic Business Informatics (<https://irmbor.co.rs/o-nama/zaposleni/>).



Since its founding in 1962, IRM Bor has undergone various minor or major organizational changes, the most significant of which are the following:

- Organizational development that took place through continuous expansion of activities during the 80's (expansion of activities successfully introduced new areas of business such as informatics, construction, architecture, geology, engineering and marketing).
- Organizational transformation into a state institute in 2007, when IRM Bor was constituted as a scientific research institution that operates in accordance with the regulations governing the legal status of public services in the Republic of Serbia.

IRM Bor employs a total of 194 workers, of which 24 doctors of science with an elective title, 29 young doctoral students at state faculties of technical direction, as well as at faculties abroad, 67 engineers and other employees with secondary professional occupations. All doctoral students are funded by the institute, which specializes through working types of training and seminars and other employees.

This educational structure of IRM Bor is very specific in the context of motivation for organizational change. It is an employee structure that requires a particularly sophisticated and balanced approach when it comes to motivation for ongoing work activities and projects as well as for planned organizational changes. That is why such an organization creates and nurtures special organizational communication, culture and special human resources management, as special aspects of motivating employees to work and change.

As for the organizational communication in IRM Bor, it is good, both when it comes to work activities, and when changes in the organization are planned and implemented. Communication is predominantly assertive and two-way, and as such increases the motivation of employees in IRM Bor where they communicate verbally in meetings, colleges and through direct conversations, and written via e-mail and internal password system as well as through the bulletin board.

When it comes to organizational culture, IRM Bor builds and nurtures mostly a culture of achievement (results-oriented, personal initiative and willingness to work hard) and an adaptive culture (which emphasizes creativity, innovation, risk-taking, initiative and entrepreneurship). Accordingly, it can be concluded that the organizational culture is motivating and suitable for introducing changes.

Management at IRM Bor is quite stimulating in terms of motivating employees to work and change. The activities that receive the most attention, in order to maintain and increase employee motivation, are employee development and rewarding. Regarding remuneration in IRM Bor, material rewards in the form of salaries presuppose

opportunities for the development of employees and their advancement in scientific, research and professional titles. This means that the management of this organization, both materially but largely by intangible rewards, motivates its employees.

In addition to an efficient salary system harmonized with regulations at the national level, the most important forms of tangible and intangible rewards, as well as motivating employees in the practice of human resources management in IRM Bor are:

- Approval of funds and leave for employees during the attendance of lectures on master's and doctoral studies and the preparation of master's theses and doctoral theses.
- Organizing participation in seminars and conferences ("October Conference").
- Publishing professional and scientific papers in journals ("Mining Works", "Copper").
- Possibility to use the extensive library fund in the field of mining and metallurgy.
- Opportunity to participate and gain knowledge and experience in domestic and foreign projects (EU projects, projects of the Ministry of Education and Science of Serbia and projects intended for the economy).
- Opportunity to participate in the development of innovations (innovative activities in the field of mining and metallurgy are practiced within organizational units: Center for Development Technologies in Metallurgy, Center for Laboratories and Center for Science).

5. SURVEY ON EMPLOYEES' ATTITUDES TOWARDS MOTIVATION IN IRM BOR

Practical research of employees' attitudes on motivation for engagement in IRM Bor was conducted through a survey and questionnaire compiled on the basis of searched electronic data sources and examples used in similar previous research. It is based primarily on a proven methodology for testing and measuring the degree of employee engagement, which is directly related to their motivation. The methodology was developed by a respectable Gallup center and it involves questioning through a questionnaire that has been widely known and recognized for years under the name Gallup's 12 questions (Gallup Q12). This questionnaire, based on the reviewed literature on this topic, was slightly corrected for the purpose of our research and supplemented with a few more questions. Questions no. 3, 14 and 15 in the questionnaire were added.



The survey was conducted on a sample of 50 respondents, employed in IRM Bor. The questionnaire contained 6 generals and 15 special questions grouped into four parts according to the types of needs of employees: basic, individual, team and developmental. It required a simple answer to the questions with Yes, Yes / No or No.

The obtained answers served to, depending on the level of satisfaction of individual needs of employees and their consequent motivation, after the analysis, be classified into one of the following three groups:

- engaged / motivated,
- insufficiently engaged / insufficiently motivated and
- uncommitted / unmotivated.

The questionnaire, which was forwarded to the respondents in printed form, had the following appearance and content:

QUESTIONNAIRE
EMPLOYEE MOTIVATION

The questionnaire in front of you is used to collect data on the motivation of employees in IRM Bor, which will be used exclusively for the purpose of preparing the paper:

Motivation of employees in the process of managing organizational change.

The questionnaire consists of two parts:

I Respondent data (6 questions)

II Attitudes towards motives for engaging in work (15 questions)

The questionnaire is anonymous.

Thanks for your cooperation and help!

I RESPONDENT DATA

Please answer the following questions by typing or circling one option:

Gender (M / F):					
Age:	- 30	30-40	40-50	50-60	60 +
Years of service:	- 5	5-10	10-20	20-30	30 +
Professional qualifications:	Medium	Higher	High	MSc	PhD
Title:	Untitled	Professional	Research	Scientific	
Workplace / Function					



II ATTITUDES TO MOTIVATIONS FOR ENGAGEMENT AT WORK

Please answer the questions by entering the number 1 in one of the empty columns:

	QUESTIONS	Yes	Yes /No	No
I	BASIC NEEDS			
1.	Do you know what exactly is expected of you in the workplace?			
2.	Do you have all the equipment and materials to do the job properly?			
3.	Do you have other necessary conditions for doing the job correctly?			
II	INDIVIDUAL NEEDS			
4.	Do you have the opportunity to do what you do best at work?			
5.	Do you often receive recognition / praise for a job well done?			
6.	Does your superior, or colleague, care about you as a person?			
7.	Is there someone in the workplace who encourages your development?			
III	TEAM NEEDS			
8.	Is your opinion taken into account at work?			
9.	Do you feel that your job is important because of the mission of your organization?			
10.	Are your associates committed and do their job well?			
11.	Do you have any of your best friends at work?			
IV	DEVELOPMENT NEEDS			
12.	Has anyone at work, in the last six months, talked to you about your progress and development?			
13.	In the last year, have you had the opportunity to progress and develop at work?			
14.	Are you just in the phase of some form of advancement at work?			
15.	Have you achieved any form of progress and development in any previous period?			

Of the 55 printed questionnaires made available to employees, the questionnaire was duly completed by 50 employees. Respondents provided answers to most of the questions asked. After receiving the answers, the sample of respondents who filled in the questionnaire was analyzed first.

Then, all their answers were analyzed in detail: individual, answers by groups of employee needs and answers at the level of the entire questionnaire. The part of the performed analysis that served as the final conclusions is shown in the following table.



Questions	Yes Number of responses	Yes/No Number of responses	No Number of responses	Yes %	Yes/No %	Yes/No %
I group	105	30	15	70	20	10
1.	30	16	4	60	32	8
2.	35	10	5	70	20	10
3.	40	4	6	80	8	12
II group	120	60	20	60	30	10
4.	39	6	5	78	12	10
5.	30	17	3	60	34	6
6.	30	18	2	60	36	4
7.	21	19	10	42	38	20
III group	100	70	30	50	35	15
8.	30	19	1	60	38	2
9.	23	15	12	46	30	24
10.	30	16	4	60	32	8
11.	17	20	13	34	40	26
IV group	160	30	10	80	15	5
12.	43	5	2	86	10	4
13.	38	8	4	76	16	8
14.	40	7	3	80	14	6
15.	39	10	1	78	20	2
In total	485	190	75	65	25	10



5.1. CONCLUSIONS AND PROPOSALS FOR IMPROVING THE PRACTICE OF MOTIVATION IN IRM BOR

By analyzing the sample of IRM employees who filled in the questionnaire within the conducted survey, it was determined and concluded that it is sufficiently representative.

Regarding the sample size, the number of respondents is in relation to the total number of employees in the organization, about 27%, which is a relatively large coverage that contributes to representativeness.

The structure of the sample according to age consists mainly of employees between 40 and 60 years of age. According to the years of work experience, the sample included the most employees with 20 to 30 years of experience. According to education and title, the sample is dominated by highly educated employees with diplomas and titles of master and doctor of science.

The determined representativeness of the sample and the detailed analysis of the answers to the questions from the questionnaire enabled the adoption of the following general conclusions on the motivation of the employees in IRM Bor:

- The answers to the questions from group I indicate that the basic needs of IRM employees are met in a relatively high percentage, fully in 70% and partially in 20% of surveyed employees, and that on this basis their motivation is satisfactory.
- Based on the answers from group II of questions, it can be concluded that the individual needs of employees are fully met in 60% and partially in 30% of surveyed employees, which is also consequently related to their relatively high motivation.
- The answers to the questions from group III indicate that the team needs of IRM employees are fully met by 50% and partially by 35% of the surveyed employees, and that this also contributes to their general motivation.
- Based on the answers from the IV group of questions, it is concluded that the development needs of employees are met to the greatest extent. They are completely satisfied with 80%, and partially with 15% of the surveyed employees, which means that this is the biggest motivating factor of employees.

At the level of the entire questionnaire, it can be concluded that IRM Bor employees are generally well motivated to engage in work and for organizational changes. 65% of them answered affirmative on the questions about meeting needs that are directly related to their motivation. 25% of employees are partially motivated, while, according to the total number of negative answers, only 10% are unmotivated employees.

With all the limitations and shortcomings of this research, based on its findings, several measures can be proposed that would in the future work of IRM Bor contribute to increasing employee motivation for work and organizational change:

- Continuous monitoring and improvement of working conditions;
- Improving project organization and teamwork culture;
- Continuous monitoring and encouragement of employee development.

6. CONCLUSION

Motivation for change is a critical moment of managing organizational change without which all the activities of the process that precede it lose their meaning and the others that follow cannot be successfully implemented.

Special findings based on the conducted research refer to the conclusions regarding certain aspects of the process of motivating members of the organization for organizational change:

- Motivating members of the organization for organizational change is impossible without good organizational communication. Assertive communication is the most adequate type of communication to motivate employees for organizational change.
- Motivating members of the organization for organizational change is impossible without a good organizational culture. Adaptive organizational culture is the most fertile basis for motivation and realization of organizational changes.
- Motivating members of the organization for organizational change is impossible without good human resource management. The motivation of employees for organizational changes is most significantly influenced by the activities of the human resources management process related to the development and rewarding of employees.

In IRM Bor, the important aspects of motivating employees for work and organizational changes are at a relatively satisfactory level. Prevailing assertive communication, and a predominantly adaptive organizational culture, along with adequate human resource management that cares about employee development and reward, are a good basis for the smooth implementation of organizational change.

The results of the survey indicate that employees are well motivated to commit to work and thus to organizational changes: 65% of respondents are motivated, 25% are relatively motivated, while only 10% are unmotivated.



Based on the previous findings, it can be finally concluded that the motivation of employees in the process of organizational change management is a critical factor on which the successful outcome of the whole process depends. Accordingly, the following recommendations are given for future theorists and practitioners in this field:

- Research should focus on proving even more convincingly the crucial importance of employee motivation in the process of managing organizational change.
- Certain aspects of motivation for organizational change should be further studied and each of these aspects should be broken down to the level that practitioners can understand and apply them as easily as possible.
- In the practice of organizations that initiate the process of organizational change, motivation must be recognized in the right way, from all aspects and in accordance with its importance.

7. LITERATURE

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HUMAN RESOURCE AUTOMATION: BENEFITS AND CHALLENGES FOR ORGANIZATIONS

Rayyan Amour Al Noumani*,
Raihan Taqui Syedi

Faculty of Business & Economics,
Modern College of Business and
Science,
Muscat, Oman

Abstract:

Technological advancements have been reshaping the business world and automation in HR processes is becoming critical for organizations in general and Small & Medium Enterprises (SMEs) in particular. HR automation not only enables them to stay connected with market needs, but also to enhance organizational effectiveness. Modern work environment is more physically disconnected than ever. Work relationships are becoming more flexible, fluid and fleeting which is affecting formulation and maintenance of long-term associations. Fast paced economic growth and technological advancements are forcing organizations to redesign themselves, so as to compete and succeed in today's global business environment. Few of these endeavors have facilitated better performance of various HR functions, but rest have posed challenges due to confusion and disruption. This article attempts to explore the scope of HR automation in SMEs by examining the benefits & challenges and illustrating the way forward for enhanced organizational effectiveness.

Keywords:

Human Resource automation, SMEs.

1. INTRODUCTION

Technology today has emerged as the new architect of the modern work world and has changed the way HR departments in organizations function. With the technological processes ever evolving and substantial changes being experienced, HR professionals are expected to do more with less. It has become imperative for organizations to utilize these technological advancements appropriately in order to facilitate organizations to capitalize on their human capital. HR Automation will continue to play a viable role in overcoming the HR challenges of 21st century. Technological upgrading has created a new generation of employees and has changed the fabrication of organizational structure. Managing workforce spread across various geographical locations, cultures, political systems has thrown up a daunting challenge for organizations.

HR Automation is not only about using new technological equipment, but also calls for re-skilling of employees and rewiring of organization culture. With the advent of globalization, rapid expansion of business and ever-demanding competitiveness, organizations today cannot rely on traditional methods of performing tasks. Absence of HR automation can have a crippling impact on modern workplace. Thus, there is a need to redefine the way organizations carry out HR functions to compete and attain success in the volatile business environment.

Rapid technological development has redefined the role of HR professionals and new roles have emerged which did not exist before.

Correspondence:
Rayyan Amour Al Noumani

e-mail:
rayyanamour97@gmail.com



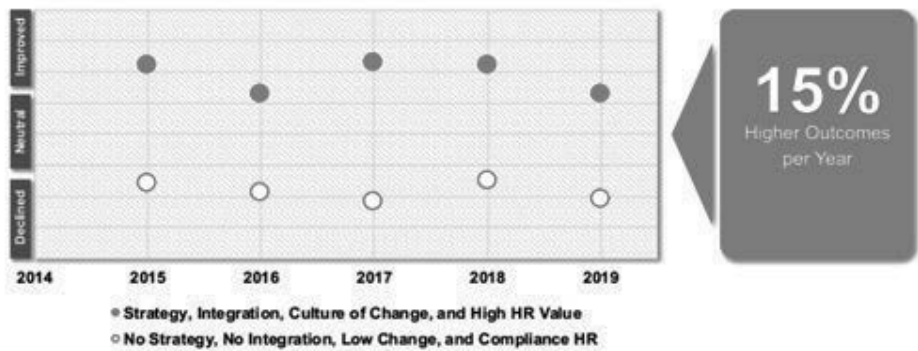
HR automation is one such panacea, increasingly helping eliminate inefficiencies and barriers to HR operations by facilitating enterprise wide integration and enhanced overall performance, speed and efficiency – thereby adding value to businesses.

The digital transformation and atomization workforce and workflow management will lead the business to be on the path of success and advancement. Moreover, the atomized system will lead to enhanced productivity, efficient strategizing and effective organizational culture. HR feature with the HR function is the chance to build new ways to contribute to organizational effectiveness through means such as knowledge management and the development of intellectual and social capital. Nevertheless, in its adoption of Information System (IS) Information Technology (IT) technologies, HR has lagged behind other internal functions. This article tries to explore the scope of HR automation in SMEs by examining the benefits & challenges and proposing the way forward for enhanced organizational effectiveness.

2. IMPACT OF HR AUTOMATION IN ORGANIZATIONS

HR function is no longer considered as an administrative activity but has become strategic partner. This has resulted in transitioning of HR professional’s role to that of a facilitator rather than implementer. Altarawneh (2010) argues that the emergence of Strategic HRM (SHRM) approach has created a real need for information about HR. Most of the studies show that HR automation helps in achieving primarily four objectives i.e. reduced time spent on administrative work, overall cost reduction, enhanced self-services and increased morale. According to Altarawneh and Al-Shqairat (2010), Ball (2001), Ngai and Wat (2006), Ruel et al., (2004), HR automation streamlines the administrative process, reduces the errors and deletes the repetitions, thereby increasing the task efficiency. Moreover, Information Technology (IT) revolution coupled with changes in social environment during the past decades have resulted in a global competitive market.

Figure 1. Year-over-Year comparison of factors correlated to organizational outcomes



Source: 2019-2020 Sierra-Cedar HR Systems Survey

According to (Greif, Kühnis & Warnking, 2016), it was found that the success between the company and its positivity is connected with the size of the company and its age; younger the company more successful the company will be in terms of advancement and functioning with technologies in HR. In addition, digital transformation can be the reason of creating multitude opportunities especially for SMEs as it will lead them to the path of success.

HR automation is a tool to digitalize the tedious and time-consuming functions and streamline all the functions of HR in order to increase the efficiency and have the ability to reduce the human errors.



Figure 2. List of key advantages and challenges of HR automation



HR automation facilitates in reducing time spent on administrative work, increases both productivity and profitability due to the faster processing times, information sharing and access to data. Also, it reduces the administrative burden, provides instant access to information. Document driven process to get work done, without sacrificing the quality of work done and thereby it, enhances the efficiency of organization. Moreover, it reduces hiring cycle times by providing access to the large number of qualifying candidates through online, and also reduces recruitment cost. It also facilitates employee retention by enhancing transparency within the organization by providing access to the previous information about organizations and employees. Furthermore, it facilitates expansion of organization by providing quick worldwide access to the information needed and also supports information sharing thereby it facilitates organization to make important timely decisions about business. Finally, it reduces operation cost by promoting paperless environment and reducing the number of employees required to perform tasks manually by automating HR process.

2.1. Benefits of HR Automation for Employees and Organizations

HR automation enhances employee motivation since they will get more done in short period of time, there are less chances for committing errors, and it also eliminates recurring monotonous jobs. Furthermore, it facilitates employees in determining their career path, as HR automation provide access to information about performance appraisal reviews, and other important information about their job and company. Moreover, it improves employee communication by providing access to job related information with the timeliness and accuracy. The recruitment processes are being cut down because of the fast exchange of information, applications can be sent within seconds, mails are being directly sent to the recruiter email address.

According to Deillon (2014) this technology is saving cost and time of an applicant and recruiter, thus the cost of technology job posting normally is lower than printed media, head-hunter, and employment agencies and more of the other traditional recruitments. Since recruitment is being automated by integrating tools to system many of the tasks will be transformed from manual to atomized tasks that will be the reason of increasing the efficiency and decreasing the working load on the administrators. Online recruiting has brought in the new term of candidates to be able to reach to passive work seekers as (Deillon, 2014) stated in an example of students in USA in the year 2000, 90% of students have been looking for jobs actively in the internet as it is showing it is a way of finding passive job seekers.

2.2. Challenges faced by Organizations regarding HR automation

Work world today is more disconnected than ever. Disruptive technologies have changed the way people work, communicate and collaborate. Organizations will have to deal with a scarcity of key talent, constantly shifting skill requirements, meeting the needs of different generation, on top of it, bringing everyone on the same page and working together is a big challenge for HR Today. Biggest challenge for the organization to consider is whether the technology adopted ensures no gap between the expected service and actual service rendered by the technology and is capable of analyzing needs of the organization and business readiness. It is also important that organization should decide on whether technology is built and managed on the inside or from outsource.

It is very important to assess whether the organization is ready to implement technological change at its current growth stage and ready to face the changes arising out of automation process. HR department is not known for early adoption and organization and can experience inertia.



Employees may not feel comfortable in adopting the new methods of doing work with the fear of losing jobs, motivating employees to work with new technology is a big challenge. HR is more complicated part of business organization. It is experiencing flood of information. Employee information located in different formats and on different media, finding what you need when you need it is a constant challenge. Organizations, including SMEs, should be clear about what kind of information should be shared - who can have access to data and who will be authorized to change information; otherwise it would result in security and privacy issues. Another biggest challenge while automating HR is to make sure that everyone in the organization stick to the company confidentiality and code of ethics, policies, employees should understand the fact that they should not disclose their passwords or compromise organization security in anyway.

3. CONCLUSION

The review of literature on HR automation and SMEs highlight HR automation is actually efficient and there are more benefits compared to the challenges. Many countries acknowledge the importance of adopting new technologies within SMEs and are encouraging the adoption of the HR systems for better outcome and achievements. Thus, SMEs and start-ups around the world are trying to replace traditional HR practices with automated processes. HR Automation and adopting new technologies within HR management in SMEs would definitely benefit SMEs in long run, result in enhanced efficiency and will lead to further advancement of processes.

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CORONA-VIRUS CRISIS AND EFFECTIVE CHANGE MANAGEMENT: ETHICAL IMPLICATIONS

Evaggelia Kiosi^{1*},
Konstantinos M. Karyotakis²,
Kyriakos Dimitriou³

¹National and Kapodestrian
University of Athens & University
of Peloponnese,
Kalamata, Greece

²Technical University of Crete,
Chania, Greece

³University of Piraeus,
Athens, Greece

Abstract:

Organizations today are bound to make frequent and substantial changes to the way they operate in a rapidly changing environment. Organizations anticipate, design for, and capitalize on change adapting concepts such as external and internal (insider) **threat** and combining strategy, research, and science in order to innovate for the emerging and unexpected. This contribution focuses on the ethical implications concerning the effective **change** management in organizations, due to **Corona-virus** crisis focusing on the new ethical dilemmas that modern **leadership** has to face suddenly. In a further approach, and through the philosophical view of **ethics**, the paper explores certain human behavior – concerning leaders and employees - that has a strong impact on successful implementation of organizational change. The common point of reference in the stated approaches is the human element, as an influencing factor, but also as a subject to change.

Keywords:

change, corona-virus, ethics, insider threat, leadership.

1. INTRODUCTION

‘This is a joke...something strange is happening but it will pass...nothing is happening...things like that happen...’ (Camus, 2001). Albert Camus’s ‘*The Plague*’ deals with human nature and fate and represents how the world deals with the philosophical notion of the ‘absurd’. ‘But the whole world is facing the same problem... - Exactly...now we are like the whole world...’ (Camus, 2001). And that is the equivocal character of a pandemic¹.

Through the centuries, humankind has experienced many ‘plagues’, but they seemed unprepared in all cases. History has to offer experiences like the Plague of Athens (430-426 BC), the Black Death (1331-1353), the Spanish flu (1918-1920), and the 2014 Ebola outbreak that infected and provoked the deaths of millions of people around the world.

Today, Covid-19 is a fast-moving crisis² that has disrupted every system and organization in the world. In fact, the impact of this crisis is multidimensional on the following: public health, the economy, politics, and everyday human life. The current pandemic has put into consideration a new dimension of the notion ‘insider threat’, a malicious threat to an organization that comes from people within it.

Correspondence:
Evaggelia Kiosi

e-mail:
evaggeliakiosi@yahoo.gr

¹ The word derives from Greek words *πᾶν* (*pan*, all) and *δῆμος* (*demos*, people) and means a disease that has spread across a large region or worldwide.

² The term ‘crisis’ derives from the Greek word ‘κρίσις’ (*crisis*), and refers to the concepts of ‘judgment’ and ‘decision’ (Benaben et al., 2016).



Indeed, the outbreak has the hallmarks of a ‘landscape scale’ crisis:

An unexpected event or sequence of events of enormous scale and overwhelming speed, resulting in a high degree of uncertainty that gives rise to disorientation, a feeling of lost control, and strong emotional disturbance (D’Auria & De Smet, 2020).

The peculiarity of a crisis situations lies in the fact that they are characterized by low readiness and high urgency. However, there is an urgent need for change; otherwise the consequences can be fatal. The changes should be immediate and targeted, adding reliability, honesty and specialization (Armenakis et al., 1993).

Covid-19 is progressing and it is a ‘revolt’ (fast moving event) that is creating a ‘release’ (breakdown) period, which will eventually lead to ‘reorganization’. New ideas, structures, and solutions might artificially ‘conserve’ old systems by resorting to new strategies (Zaidi, 2019).

There has never been a greater challenge for leaders of this generation (von Eck, 2020). As it has been argued ‘leadership is the capacity of a human community to shape its future’ (Razzetti, 2020).

In times of crisis all stakeholders need guidance by capable leaders. It is crucial for leaders to focus on the broader societal environment, align their operational practices, and treat stakeholders as humans (Winkler Titus, 2020).

This contribution focuses on the ethical implications concerning the effective change management in organizations, which must be targeted and time sensitive due to Corona-virus crisis; focusing on the new ethical dilemmas that modern leadership suddenly has to face.

In a further approach, and through the philosophical view of ethics, the paper explores certain human behavior – concerning leaders and employees - that has a strong impact on successful implementation of organizational change. The common point of reference in the stated approaches is the human element, as an influencing factor, but also as a subject to change.

2. LITERATURE REVIEW

2.1. Facing Covid-19: Recognize

‘The spread of the pandemic has brought to the fore the need for business leaders to recognize the crucial interdependencies between business and its environmental, social, and governance context’ (Hamann, 2020).

It has been argued that three major drives will influence the trajectory of the pandemic (Morrison & Carroll, 2020):

- the virus itself,
- government tools,
- technology.

Changes can affect structure (functional change), process, values or power distribution. When changes are made to all those sectors, they refer to a systemic approach change (Cao et al, 2000). Another categorization of changes (Cao et al., 2000, 187) is described in Table 1.

Table 1. Classification of Organizational Change

Category of Organizational Change	Reference (s)
Strategic and non-strategic	Pettigrew (1987), Rajagopalan and Spreitzer (1997)
Incremental and radical	Burnes (1992), Johnson and Scholes (1993), Goodstein and Warner (1997)
Incremental and ‘quantum’	Greenwood and Hinings (1993)
Changes of identity, co-ordination and control	Kanter et al. (1992)
Human-centered classification of change at individual, group, inter-group or organization level	Burnes (1992)
Planned change and emergent change	Wilson (1992)
Change in terms of scale (from incremental to radical) and centrality (from peripheral to core) to the primary task of the organization	Buchanan and Boddy (1992)

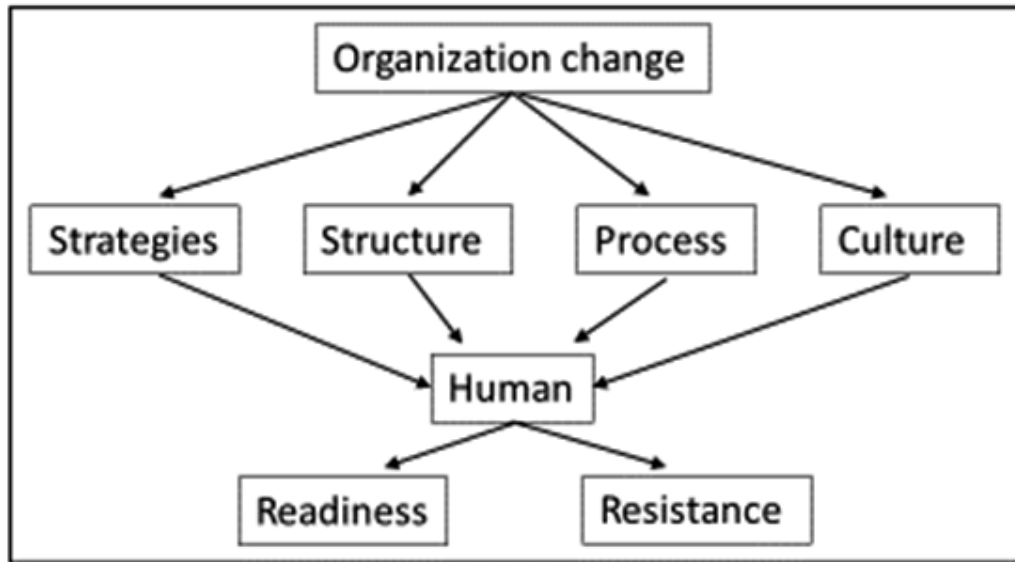


Table 2 depicts the nomenclature of organizational change. Scheduled or unpredictable events can lead to the urgent need for structural measures regarding the re-designing of strategies, structure, processes and culture of an organization. The role of individuals in the continuous and dynamic process of organizational change should not be underestimated.

On the contrary, it should be widely understood that individuals constitute the backbone and the driving force in this procedure.

After all, an organization may announce change, but people are the ones who are called upon to implement those decisions that are expected to bring this change.

Table 2. The focal point of the humankind in the process of organization change.



Modified by Shah et al. (2017, p. 367).

The behavior and reactions of human capital can support a change (when there is a high degree of readiness to change) or even stimulate it (when there is a high degree of resistance to change).

In change management, the crucial point is untwisting the interconnection of the individual parts, the way that the change in one of them affects the others and the whole system, as well as how the harmony is achieved (Duck, 1993).

Bibliographic review of Shah et al. (2017) of the workplace identifies workplace and individual factors that affect readiness to change.

Workplace factors include: active and passive job, appropriateness, change efficacy, communication, decision latitude, discrepancy, flexible policies and procedures, job demands, job knowledge and skills, logistic and system support, management and leadership relationships, organizational commitment, organizational culture, perceived organizational support, personal valence, social relations in the workplace, social support, wellness and justice.

Individual factors include: adaptability, autonomy, beliefs, demography, depression, emotional exhaustion, general attitude, job related attitude, intention to quit, self-efficacy, job satisfaction, participation, personal resilience, rebelliousness, skills variety, supervisory support, team work, trust (in peers, management, and senior

leaders), turnover, work irritation, affective commitment, personality and training.

On the other hand, factors regarding resistance to change include: emotion, ineffective communication, insufficient planning, and lack of readiness, leadership failure, non-satisfaction, politics and uncertainty.

People are the most important asset in any business organization, while in the context of competition between them, the quality of employees is also an advantage. Nevertheless, people have their advantages and disadvantages, since each of us is different. We all have feelings, stress and make mistakes. An internal threat, therefore, occurs when these factors cause an employee to, intentionally or unintentionally, endanger valuable information, material, people, or facilities.

The COVID-19 pandemic is clearly an important factor in increasing the risk of negligence or malicious confidential information on critical assets and data. When combined with huge financial uncertainty, the loss of critical assets including research and development, proprietary information and critical equipment, it can impede an organization's recovery. The threat of internal threats is often overlooked, but it can be so detrimental to the employer that it can lead to the collapse of a business. It can be intentional (in the form of a disgruntled employee,



or accidental (workers causing unintentional harm, for example, by clicking on a phishing fraud link) for three main reasons:

- a. Working from home environment. Staff cannot be closely monitored while being at home, making the risk of an unintentional accident higher.
- b. The increase of opportunistic factors. In times like these, hackers are a big problem as they take advantage of situations and their attacks increase rapidly.
- c. Employee morale. Employees may feel more distracted from the workplace as they are not physically present in the office (this increases the longer the quarantine regime lasts). They are also concerned about job security, especially if pay cuts have been imposed, or worse if layoffs are taking place. This can increase the 'intentional threat' where staff may be more motivated to harm their employer.

2.2. Facing Covid-19: Response

Since a crisis is ruled by unfamiliarity and uncertainty, effective responses are largely improvised (Howitt & Herman, 2009).

In general, in cases of crisis, three types of leadership are indicated (VanWart & Kapucu, 2011):

- a. Need for calm but 'strong' leadership. The leader must be able to make valid and timely decisions, despite the stressful and chaotic situations he may experience, avoiding showing panic, the existence of which can be even worse than the very criticality of the situation. Perceived competence needs: self-confidence, willingness to assume responsibility, motivating, articulating vision and mission, resilience, communication skills.
- b. Need for decisions that require excellent analytic skills under strict time constraints and resource constraints. Often, there is no time for system alteration and adaptation or long-term enhancements. In addition, leaders need to be flexible and adapt to developments and new data. Perceived competence needs: decision making, analytic skills, decisiveness, flexibility, delegating.
- c. There is a need for 'strong' leadership style as well as for more 'routine' managerial tactics and restructuring. There must be flexibility of individual teams, greater delegation, and assurance of leaders that teams remain engaged, even in cases of exhaustion. Cases of expansion of parties involved should also be considered. Perceived competence needs: operations planning, team building, networking and partnering, social skills.

However, no system can be implemented effectively and successfully, no matter how well designed, if people are not convinced of its usefulness and are reluctant to use it.

Oral and written speeches, declarations, personal communication and presence etc. are required in order to achieve convincing communication. In this way, emphasis should be given to human capital (and its reactions), which is dynamically involved and influences the outcome of the change process.

It is important to cultivate a culture of readiness and maturity, where mutual efforts will be made. This mentality must be nurtured in such a way that it is possessed by an excellent channel of communication, respect, appreciation and commitment between all parties involved (Karyotakis & Moustakis, 2014), as well as limiting phenomena of resistance to change (Karyotakis & Moustakis, 2016). Rational management of external information and active participation certainly add value to crisis situations, and that is what is required. However, due to the time constraints that exist, it is difficult to achieve their optimal utilization.

VanWart & Kapucu (2011) highlight, among other things, the importance and effectiveness of technical and political communication in cases of crisis. Note that technical communication is required to be precise, concise and confirmed. On the other hand, in terms of communication at the political level, as a manager typically notes in their research, a leader should be able to formulate the message in the right way and become a part of it, both to the immediate recipients and to the general public.

Regarding the constantly evolving notion of insider threats, it is of great value taking precautionary measures, improving existing policies and implementing new ones to better protect critical assets in the face of emerging threats:

- a. policies - implementing clear policies that will be understood by all;
- b. education - providing all employees with regular mandatory training e.g. on detecting phishing fraud, how to report suspicious activity and how to keep data secure;
- c. contact - informing employees about the risk of internal threats that must be channeled by management to employees. Regular employee-management contact can help staff feel supported and supported by it and increases the likelihood of reporting any suspicious activity;
- d. regular review - re-evaluation - it is important that risk and data management is an ongoing obligation. Training and communication should be regular and policies should be reviewed regularly to ensure that they are up to date and still followed by staff members.



2.3. Facing Covid-19: Ethical Implications

It has been argued that due to Covid-19 crisis 'we need a leadership revolution. To get rid of leadership labels and start building a new model to thrive in this new normal. Developing meta-skills is critical to improving our ability to lead effectively' (Razzetti, 2020):

- a. Increased Self-Awareness;
- b. Being Empathetic;
- c. Promote Psychological Safety;
- d. Embrace Intellectual Humility;
- e. Collective Leadership;
- f. Balancing candor with optimism.

On the other hand, as Kaptein underlines:

The three important yardsticks of work are the three 'Es' (Kaptein 2019, 29):

- a. Effectiveness (the extent to which the goals are achieved).
- b. Efficiency (the extent to which the goals are achieved with the least possible effort).
- c. Ethics (the extent to which the goals and means are morally good).

It has been argued that without the study of ethics, the understanding of leadership is incomplete: Ethical values always take part in leadership, regardless of whether leaders are clearly aware of the fact. In addition, it has been argued that leaders recognize their responsibility as the main guardian of their group's values (Demetroules, 2015).

Regarding the definition of 'ethics':

Ethics is about what drives you (compassion), who you are (integrity), how you appear (honesty), how you act (trustworthiness), how you treat others (equality) and what you achieve (sustainability) (Kaptein 2019, 153).

A recently conducted research by the Ethics Institute has pointed out that the ethical culture of an organization should combine (Van Vuuren & Vorster, 2020):

- a. ethics accountability and responsibility;
- b. the commitment of non-managerial employees, middle management and leadership (senior management) commitment to ethics;
- c. ethics talk;
- d. the ethical treatment of people;
- e. ethics awareness in the organization.

In situations like the Covid-19 crisis, Rossouw suggests moral imagination not only to deal with ethical dilemmas, but also to try and prevent moral dilemmas from occurring in the first place:

Leaders in organizations cannot rely on ready-made answers that can be downloaded from a platform, or on algorithms that can solve the tough choices on their behalf. It requires leaders to go through the process of consulting with others, but also consulting their own conscience and values. It demands moral reasoning to come up with the best possible solution, while still carrying the weight of the knowledge that there will be collateral damage (Rossouw, 2020).

3. CONCLUSION

'The world will never be the same again after Covid-19. The Corona-virus pandemic will change the world order forever' (Kissinger, 2020).

Pandemics change the trajectory of history by transforming societies, organizations, people, but also norms, and governing structures.

Visions of the future need to account for reframing in three areas: capabilities, operations, relationships, and how they interact with each other in order to help humanity prepare for the challenges ahead.

It has been argued that 'crisis always has the potential of bringing out the best and the worst in human beings. This is not only true of individuals, but also of organizations' (Rossouw, 2020).

The role of individuals in the continuous and dynamic process of organizational change is crucial. Emphasis should be given on human capital, which is dynamically involved and influences the outcome of any change process.

The Covid-19 pandemic is projected to increase the incidence of internal threats to organizations and businesses. This prediction combined with social inequalities, poverty and unemployment poses new challenges in the context of effective change management.

Workplace and individual factors that affect readiness for change regard effective communication and leadership, as well as ethical culture and awareness in organizations.

The current crisis 'calls for the best in humanity with ethical principles as our compasses' (Azulay, 2020).

Leaders of states and organizations therefore need to adapt their policies and practices paying attention that all stakeholders are simply seen as humans. Besides the evolution of technology and the new types of threat it challenges, the nature of humanity still alleges that sustainability can be realized only through respect and ethical treatment of the human element.

Ethics is about asking the right questions. It is critical to acknowledge the worth of moral reasoning and ethical leadership as a factor of effective change management.

After all, 'maybe, it is still too soon to predict the implications of the corona pandemic. But it is never too soon to think about these issues' (Levy, 2020).



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CONTRIBUTION OF COACHING SKILLS TO LEADERSHIP

Slavica Squire

PhD candidate,
Singidunum University,
Institute for Neuro-Linguistic
Programming,
Belgrade, Serbia

Abstract:

Coaching uses a range of skills to help individuals and teams shift their perspective in order to discover different approaches that can be used to achieve their goals. It supports individuals and teams in using their own resources, options and skills supporting any endeavor. Quality of leadership is perceived as critical to the success of any organization. In the modern business world, leaders more and more often rely on coaching skills to enable their employees overcome challenges they face. The results of the research presented in this paper show that in most of the organizations from which the participants came there is no coaching support of employees, while the research participants found that coaching education and coaching skills improved their leadership, communication and interpersonal relationships and contributed to their success.

Keywords:

coaching, organizations, leadership, skills.

1. INTRODUCTION

Coaching is a frequent topic in management literature and among the most frequently discussed leadership skills (Hunt & Weintraub, 2004). It has been defined in a number of ways and in general it is a process in which a person's resources and competencies are developed. Managerial coaching aims to correct employee behaviors and thus improve organization's results and retain employee in the organization (Gilley et al, 2010, Tanskanen et al, 2019).

Leaders are increasingly being called upon to coach employees as the benefits of coaching become more and more evident. "Managerial coaching" can take place in formal coaching sessions or informally, on an ad hoc basis (Milner et al, 2018). In using key coaching skills managers try to enable employees to work out solutions for their own issues by themselves instead of expecting managers to do so on their behalf. When managers role model coaching behaviors, it is more likely that employees will establish the same kind of behavior with clients, and thus establish a better client relationship, which can lead to improved personal satisfaction and higher performance.

2. REVIEW OF THE LITERATURE

The four key coaching competencies are support, listening, feedback and asking precise questions (Hall, 2015).

Coaching is supporting a person to understand and transform personal situation in accordance with the person's desire. Rapport as one of the key competencies necessary for coaching is establishing a close relationship with a client, so that the client can feel safe,

Correspondence:
Slavica Squire

e-mail:
slavica@nlpinstitut.com



understood and respected in order to accept challenges, receive useful feedback, change and transform (Hall, 2015). The aim of a coach is to establish an environment with as much safety, warmth and empathic understanding as possible (Hayes, 2006, Gilley et al, 2010, Squire, 2016a, Squire, 2017b).

Coaching as any other engaged and respectful communication starts with active and engaged listening and it unveils deep structure behind the content. Active listening is important because coaching mostly depends on unambiguous communication and good relationship. That is listening and reaction to what and how a client speaks, which leads to better mutual understanding and relationship (Haneberg, 2016, Gilley et al, 2010).

Feedback functions as a mirror – it reflects what and how we do something. It is an important indicator of the quality of interpersonal relationships and achievements of teams, valuable for further progress and improvement. Feedback requires expertise. It is about issues that may be addressed and it has a structure (Rogers, 2012, Gilley et al, 2010).

Effective questions in coaching provoke thinking and raise client’s self-awareness. They make client stick to the agenda, they go beyond by asking for discovery and encourage the coachee to take responsibility for himself (Haneberg, 2016, Gilley et al, 2010). Questions are tools which activates internal processes since the human mind has defense mechanisms to fight against arguments and advice.

The aim of the research presented in this paper was to analyze coaching skills in managerial practice and the influence of coaching skills on leadership, communication and interpersonal relationships in organizations, as well as assess the contribution of competencies of coach on the personal success of managers.

An imperative part of building any practice is measuring its effect or what success practicing it looks like. There are no measures that can tell if coaching efforts have been successful. Some experts say that success can be measured by mini surveys designed to determine the degree of progress against goals over some period or some measurable change in leadership behavior (Haneberg, 2016). As all the participants of the research presented in this paper are performers judging by their educational background and their job titles, the research focused on their results and impact of coaching training on their success.

3. METHODOLOGY

Thirty persons participated in the research. All of them are managers of various sectors of public enterprises, private and international companies and all of them attended the Coaching Academy and acquired the researched competencies.

The sample consists mostly of women (73.3%). The dominant age group is from 41-50 years (60% of participants). As far as education is concerned, 50% of the participants hold a master’s degree. The average length of service is 19.7 years, and most of the participants work in private companies (43.3%). The research was conducted using a Google Forms questionnaire. Detailed characteristics are presented in Table 1.

Table 1. Research sample characteristics (N=30)

SAMPLE CHARACTERISTICS	
Description	Percentage
Respondent’s gender	
Male	26,7
Female	73.3
Respondent’s Age	
31-40	30
41-50	60
51-60	10
Educational background	
College	36.7
Master’s degree	50
Professional master	13.3
Type of company	
Public enterprise	26.7
Private company	43.3
International company	23.3
Other	6.7
Average length of service: 19.7 years	

Source: Research



The instrument used for collecting data was a questionnaire consisting of several parts. The first contained questions regarding sociodemographic characteristics of the participants (gender, age, education) and information regarding the type of the organization they were employed by, the length of service, occupation etc.

The second part contained questions about the most important coaching skills for the participants, the most frequently used competence and the least used competence. Four answers were offered for all three questions: listening, support, asking precise questions and feedback.

In the third part of the questionnaire participants rated usefulness of the skills on Likert scale (1- not useful at all, 2 – relatively useless, 3 – unclear, 4 – relatively useful and 5 – completely useful) in specific activities: motivating coworkers, collecting precise information, unambiguous communication, better understanding, initiating necessary change, positive influence in dialogues, personal success, personal disburdening, releasing tensions, improvement of interpersonal relations.

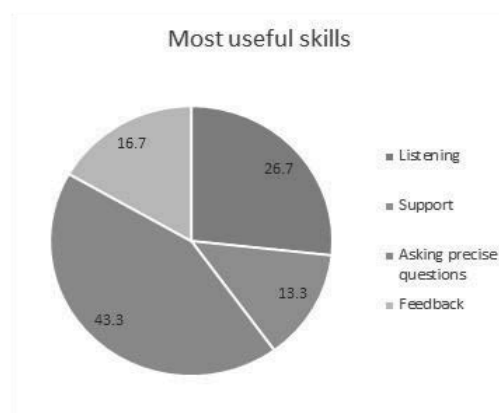
The last part measured influence of coaching training and coaching skills on the improvement of leadership skills, better communication, the improvement of managerial skills, the improvement of interpersonal relationships, the improvement of the skills necessary for coworkers' motivation, rising probability of getting promoted, stress reduction, personal development, personal success and personal satisfaction. Responses were measured on the scale from 1 to 5 (1 – no influence, 2- partially without influence, 3- undetermined, 4- partial influence, 5 – complete influence).

4. RESULTS AND DISCUSSION

Table 1. reports that almost three quarters of the participants were women, and that most of the participants were from 41 to 50 years old. All the respondents are performers generally, which is why they put effort in developing different skills, which in turn results in success at work. The largest number of respondents work in private companies.

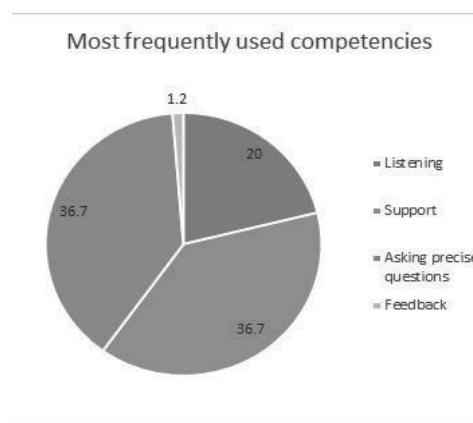
Chart 1. reports that asking precise questions is most frequently used skill with the best results for managers. Respondents perceive listening as somewhat less important, while feedback and support follow them and are almost of equal importance.

Chart 1. Most useful coaching skill



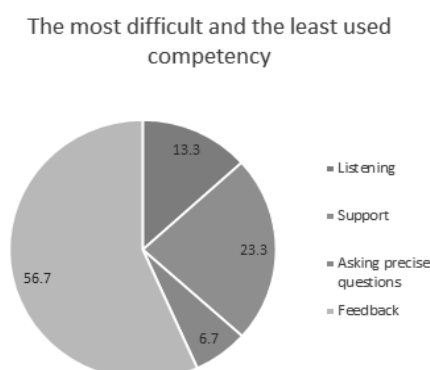
Support and asking precise questions are used equally. Listening follows them, while feedback as the most complex competence is least used (Chart 2).

Chart 2. Most frequently used competencies



Respondents found that feedback is the most difficult competence since it is a complex skill which requires a good state of coach. It is necessary to give feedback as soon as possible and at the same time be emotionally balanced and capable of making a good judgement. The competence requires to give an employee some feedback and follow up on it by making suggestions on how to further improve some behavior or state in the future (Chart 3.).

Chart 3. Most difficult and least used competencies





4.1. Results of descriptive statistics

Respondents rated usefulness of listening skill in managerial practice for various activities on a 5-point Likert-type scale from not useful at all to completely useful.

The results are presented in Table 2. and ranked from those activities for which listening is most useful to the ones they considered to be least influenced by listening skill.

Table 2. Perception of importance of listening

Listening in managerial practice is useful for:	Mean value of answers	Average deviation
Collecting precise information	4.67	0.661
Unambiguous communication	4.47	0.73
Better understanding	4.47	0.819
Improvement of interpersonal relationships	4.4	0.77
Positive influence in dialogue	4.3	0.837
Initiating of necessary change	4.1	0.923
Personal success	4.07	0.907
Motivation of coworkers	3.97	0.85
Releasing tension	3.67	1.061
Personal disburdening	3.53	1.106

Source: Research

Respondents indicated that listening is most important for collecting precise information, unambiguous communication and better understanding. The highest percentage of participants uses this skill in all types of communication with coworkers and employees.

Using the same 5-point scale respondents were asked to rate the significance of providing support in all business activities, and they found it to be the most important for influencing coworkers in dialogue, initiating necessary change, motivation of coworkers and improvement of interpersonal relationships.

Table 3. Perception of importance of providing support

Providing support in managerial practice is useful for:	Mean value of answers	Average deviation
Positive influence in dialogue	4.70	.596
Initiating necessary change	4.60	.621
Motivation of coworkers	4.60	.675
Improvement of interpersonal relationships	4.60	.814
Personal success	4.37	.765
Better understanding	3.90	.923
Releasing tension	3.87	1.279
Unambiguous communication	3.67	.844
Personal disburdening	3.57	1.278
Collecting precise information	3.50	.820

Source: Research



Asking precise questions is particularly important for collecting precise information, unambiguous communication and better understanding (Table 4).

Giving and receiving feedback is particularly useful for better understanding, improvement of interpersonal relationships and motivation of coworkers (Table 5).

Table 4. Perception of significance of asking precise questions

Asking precise questions is particularly important for:	Mean value of answers	Average deviation
Collecting precise information	4.70	.702
Unambiguous communication	4.57	.728
Better understanding	4.50	.861
Personal success	4.37	.928
Improvement of interpersonal relationships	4.23	.935
Initiating necessary change	4.17	.986
Positive influence in dialogue	4.13	.860
Personal disburdening	3.87	1.074
Motivation of coworkers	3.87	1.008
Releasing tension	3.77	1.006

Source: Research

Table 5. Perception of importance of giving and receiving feedback

Asking precise questions is particularly important for:	Mean value of answers	Average deviation
Collecting precise information	4.70	.702
Unambiguous communication	4.57	.728
Better understanding	4.50	.861
Personal success	4.37	.928
Improvement of interpersonal relationships	4.23	.935
Initiating necessary change	4.17	.986
Positive influence in dialogue	4.13	.860
Personal disburdening	3.87	1.074
Motivation of coworkers	3.87	1.008
Releasing tension	3.77	1.006

Source: Research



Respondents rated influence of coaching training and practicing coaching skills on various aspects of their jobs on the same 5-point Likert-type scale ranging from no

influence at all to complete influence useful. The results are presented in Table 5a.

Table 5a. Influence of coaching education and practicing coaching skills

Influence of coaching education and practicing coaching skills on:	Mean value of answers	Average deviation
Personal development	4.77	.626
Personal satisfaction	4.77	.568
Better communication in general	4.73	.583
Personal success	4.70	.651
Improvement of manager's skills	4.67	.606
Improvement of leadership skills	4.60	.675
Improvement of interpersonal relationships	4.53	.681
Improvement of skills necessary for motivating coworkers	4.47	.681
Stress reduction	4.40	.724
An increase in the probability of getting promoted	4.10	1.029

Source: Research

It is evident that respondents highly rated influence of coaching training and coaching skills on all aspects of their jobs and in particular personal development, personal satisfaction, better communication in general and personal success. At the same time, they find that an increase in the probability of getting promoted is least influenced.

4.2. Analysis of variance - ANOVA test

ANOVA test was used in order to establish the difference in answers between respondents of different educational background, age groups and from different types of organizations (public enterprise, private or international company). The results imply that as far as educational background is concerned, there is a difference only in the perceived significance of asking precise questions in order to motivate coworkers. LSD Post Hoc test demonstrates that professional masters perceive asking precise questions as less useful for motivation of coworkers than masters and college graduates.

As far as age of respondents is concerned, several differences were noticed:

- Respondents of different age groups perceive importance of providing support in everyday managerial practice in order to influence a person in dialogue differently ($F=3.881$, $p=.003$). LSD Post Hoc test shows that respondents from age group 51-60 perceive providing support in managerial practice as less useful for positive

influence in dialogue than respondents from age groups 41-50 and 31-40.

- Respondents of different age groups perceive differently the significance of asking precise questions in order to collect precise information ($F=4.502$, $p=.021$), for better understanding ($F=4.091$, $p=.028$), positive influence in dialogue ($F=3.830$, $p=.034$), releasing tension ($F=3.433$, $p=.027$) and improvement of interpersonal relationships ($F=3.388$, $p=.049$). LSD Post Hoc test shows that respondents from age group 51-60 perceive asking precise questions as less important for collecting precise information, better understanding, positive influence in dialogue, releasing tension and improvement of interpersonal relationships than those from age groups 41-50 and 31-40.
- Respondents from different age groups differ according to their perception of the influence of giving and receiving feedback on better communication ($F=3.323$, $p=.051$), positive influence in a dialogue ($F=4.819$, $p=.016$), personal disburdening ($F=9.720$, $p=.001$), releasing tension ($F=11.536$, $p=.000$), and improvement of interpersonal relationships ($F=6.217$, $p=.006$). The respondents from the age group 51-60 perceive giving and receiving feedback in order to improve interpersonal relationships as less important than those from the age groups 41-50 and 31-40. On the other hand, respondents



from the age group 41-50 perceive giving and receiving feedback as important for unambiguous communication, positive influence in dialogue and personal disburdening and releasing tension in managerial practice.

- Respondents of different age groups perceive differently the influence of coaching training and practicing coaching skills on better communication in general ($F=6.217$, $p=.006$), improvement of leadership skills ($F=6.217$, $p=.006$), stress reduction ($F=6.217$, $p=.006$) and personal satisfaction ($F=6.217$, $p=.006$). The respondents from the age group 41-50 perceive coaching training and practicing coaching skills to be influencing better communication in general more than respondents from the age group 51-60. The respondents from the age group 51-60 indicated that coaching training and practicing coaching skills influence improve managerial skills, reduce stress and improve personal satisfaction less than younger respondents.

There are significant differences in the answers of the participants from different types of companies, especially between those from public enterprises on the one hand and those from private and international companies on the other.

- Respondents from different types of companies differ according to their perception of usefulness of listening in managerial practice in order to collect precise information ($F=4.383$, $p=.023$), to achieve unambiguous communication ($F=3.580$, $p=.042$), personal success ($F=3.570$, $p=.043$) and to improve interpersonal relationships ($F=7.752$, $p=.002$). The results of LSD Post Hoc test show that the participants from public enterprises find listening in order to collect precise information and to improve interpersonal relationships less important than the respondents from private and international companies. They also find it less important for unambiguous communication, as well as for personal success.
- The perception of usefulness of providing support in managerial practice in order to motivate coworkers ($F=5.058$, $p=.014$), to make positive influence in dialogue ($F=4.992$, $p=.015$), and to improve interpersonal relationships ($F=4.932$, $p=.016$) differs depending on type of company.
- The results of LSD Post Hoc test show that employees from public enterprises perceive providing support in managerial practice as less useful for motivation of coworkers, positive influence in dialogue and improvement of interpersonal relationships than the employees from private and international companies.

- The perception of usefulness of asking precise questions in order to achieve positive influence in dialogue ($F=6.852$, $p=.008$) is different in the case of employees from different types of companies. The employees from public enterprises find this competence less useful than the employees from international companies.
- Participants from different types of companies perceive differently the usefulness of giving and receiving feedback in order to motivate coworkers ($F=6.852$, $p=.008$), to collect precise information ($F=6.852$, $p=.008$) and to achieve positive influence in dialogue ($F=6.852$, $p=.008$). LSD Post Hoc test indicates that those from public enterprises find it less useful than those from international companies.
- There are also differences in the perception of the influence of coaching training and practicing coaching on the improvement of leadership skills ($F=5.050$, $p=.014$), better communication in general ($F=4.992$, $p=.015$), and better motivation of coworkers ($F=7.549$, $p=.025$). The respondents from public enterprises find them less useful than those from private and international companies.

4.3. Pearson's correlation coefficient

Pearson's correlation coefficient was applied to analyze the covariance of length of service and significance of the selected skills in managerial practice for the analyzed issues. The results show that there is no correlation between the length of service and significance of providing support for the analyzed topics. On the other hand, the length of service was closely connected to the significance of giving and receiving feedback and asking precise questions. Pearson's correlation coefficient implies that significance of providing support in order to achieve personal success and personal disburdening rises with longer service of respondents.



Table 6. Correlation of length of service with significance of providing support in managerial practice

	Length of service
Motivation of coworkers	-0.183
Collecting precise information	0.093
Unambiguous communication	0.17
Better understanding	0.011
Initiating necessary change	0.01
Positive influence in dialogue	0.057
Personal success	.390*
Personal disburdening	.393*
Releasing tension	0.3
Improvement of interpersonal relationships	0.145

Source: Research

Apart from that, perceived importance of giving and receiving feedback rises with longer service in case of initiating necessary change, better understanding, personal success and releasing tension.

Table 7. Correlation of length of service and perception of significance of giving and receiving feedback in managerial practice

	Length of service
Motivation of coworkers	0.237
Collecting precise information	0.119
Unambiguous communication	0.339
Better understanding	.447*
Initiating necessary change	.383*
Positive influence in dialogue	0.323
Personal success	.430*
Personal disburdening	0.229
Releasing tension	.423*
Improvement of interpersonal relationships	0.035

Source: Research

4.4. Discussion

Respondents found that asking precise questions is the most useful coaching skill. They found listening, giving and receiving feedback and support less useful probably because these are more demanding coaching skills that require coaching experience in order to be put into practice. The results of the survey also show that they use support and asking precise question most often, somewhat less listening, and that they give and receive feedback least probably because it is the most demanding skill.

Managers find listening as a completely useful competence for collecting precise information, unambiguous communication and better understanding, while a small number of respondents found it relatively useless for motivation and better understanding. Listening is least important for personal disburdening, releasing tension and motivation of coworkers, which leads to the conclusion that managers probably need to develop this competence through its active application in everyday business environment in order to fully develop it.

Respondents found providing support completely useful for motivation of employees and relatively useful for better understanding. The highest importance of providing support is evident in the case of a positive influence in dialogue, initiating necessary change, motivation of coworkers and improvement of interpersonal relationships.

Respondents from the age group 51-60 perceive providing support as less important for achieving positive influence in dialogue. Participants from public enterprises perceive providing support in order to motivate coworkers, achieve positive influence in dialogue and improve interpersonal relationships as less important. Perceived significance of providing managerial support in order to achieve personal success and personal disburdening rises with longer service.

The respondents from the age group 51-60 perceive asking precise questions in order to collect precise information, achieve better understanding and positive influence in dialogue, release tension and improve interpersonal relationships as less important than the respondents



from the age groups 41-50 and 31-40. The respondents from public enterprises perceive asking precise questions in order to achieve a positive influence in dialogue as less important than the respondents from private and international companies. There is a positive correlation between the length of service and perceived significance of asking precise questions.

As far as asking precise questions is concerned, respondents perceive it as completely useful for all types of communication with coworkers and employees and most valuable for collecting precise information, unambiguous communication, better understanding.

Most respondents perceive giving and receiving feedback as completely useful for various types of communication and situations, from motivation to better understanding, and some of them perceive it as relatively useful, while almost no one rated the skill as not useful at all. Respondents find giving and receiving feedback particularly useful for better understanding, improvement of interpersonal relationships and motivation of coworkers in managerial practice. The respondents from the age group 51-60 perceive giving and receiving feedback as less useful for the improvement of interpersonal relationships in managerial practice than those from the age groups 41-50 and 31-40. On the other hand, the respondents from the age group 41-50 perceive giving and receiving feedback in managerial practice important for unambiguous communication, positive influence in dialogue, personal disburdening and releasing tension more than those from other age groups. The respondents from public enterprises perceive giving and receiving feedback as less useful for motivation of coworkers and collecting precise information than those from private and international companies. The length of service correlates positively with perceived significance of giving and receiving feedback. The perceived significance of giving and receiving feedback in order to initiate necessary change, for better understanding, personal success and releasing tension rises with longer service.

5. CONCLUSION

The research indicates that managers believe that coaching training and practicing coaching improved their leadership skills. The perception of usefulness of coaching training and practicing managerial coaching is influenced both by the type of organization respondents come from and by the age of managers. The managers from private and international companies and those below the age of 51 perceive managerial coaching skills as more useful for all types of the researched activities and for all the researched issues. There is a positive correlation between the length of service of respondents and their perception of significance of coaching skills.

Significance of providing support in some aspects of managers' jobs rises with the length of service of respondents.

Findings of the research suggest that managerial coaching improves leadership skills, communication and interpersonal relationships and contributes to managers' success. Given the increasingly competitive business environment, coaching skills may provide a needed advantage.

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KNOWLEDGE MANAGEMENT AS A DRIVER OF COMPANY'S COMPETITIVE ADVANTAGE

Miloš Petković^{1*},
Lilian Del Real Ramirez²

¹Singidunum University,
Belgrade, Serbia
²IAE de Nice, Graduate School of
Management,
University Sophia Antipolis,
Nice, France

Abstract:

In the last twenty years, global economy has changed radically. The industrial capitalism has transformed to capitalism based on knowledge. That change was revolutionarily in the current corporate world. In the core of knowledge-based economy are no longer tangible assets. Instead of them, intangible assets are now seen as its core. Information management presents the input, whereas knowledge management represents the final production output. In order to prevent these problems, there is the question of how knowledge is produced and used for some future economic value. The lack of identification of final outcomes coming from intangible assets may result with a huge loss of business opportunities.

Keywords:

knowledge management, competitive advantage, intellectual capital.

1. INTRODUCTION

In the economy based on knowledge, many corporations try to apply some of the knowledge management strategies mainly because knowledge is a core intangible resource (Skrzypek, 2004). Because of that, companies implement different processes of knowledge management that have a very significant role in the whole organization (Bitkowska, 2010; Drucker, 2003).

Knowledge management grew in the last 20 years as a tendency to create, acquire and communicate knowledge and improve its utilization because of the fact that individuals themselves cannot use the full potentials of their knowledge. At the same time, organizations cannot completely implement the knowledge they own as well, so organizations try to acquire and create new innovations that can be maximally used to increase organizational final result (King, 2009). Nowadays, companies must be innovative in the highly competitive global market. Considering all challenges that they face, it is of high importance to continuously capture competitive advantage. Hesitant customers, harsh competitors, advanced technology and new business models are all elements that create its business environment and force companies to remodel their operations (Nowacki and Bachnik, 2016).

Our paper is composed of six sections. The first two chapters are about knowledge and knowledge management. Further, it will be described how knowledge management and intellectual capital are interrelated, and how competitive advantage of a company comes from knowledge management. The final sixth section concludes our study.

Correspondence:
Miloš Petković

e-mail:
mpetkovic@singidunum.ac.rs



2. WHAT IS KNOWLEDGE?

Knowledge can be very often defined as a personal belief (King, 2009). Traditional resources such as labor, land and financial capital surpasses completely the importance of knowledge. Knowledge can improve a company's competitive advantage (Nonaka, 2000; Quast, 2012; Wu and Wang, 2006). Knowledge is very important resource for all types of companies (Holsapple & Joshi, 2000).

Literature proves that traditional financial indications of performance pay a little attention to the knowledge importance. These indications were under huge criticism in the last decades (Johnson and Kaplan, 1987; Kaplan, 1983; Thiel and Leeuw, 2002). Literature from management science has seen the role of knowledge in global competitiveness as very important. Knowledge is recognized as more sustainable and durable than any other resource within a company that will improve competitive advantage at the end (Barney, 1991; Drucker, P.F., 1988; Grant, 1991). Knowledge as a strategic resource improve organizational capabilities on the global market (Prahalad and Hamel, 1990).

3. KNOWLEDGE MANAGEMENT DETERMINATION

The process within a company that plans, organizes, motivates and controls people in order to ensure the improvement and effective use of knowledge assets is seen as knowledge management. All printed documents, such as patents, licenses, manuals, knowledge kept in electronic bases are knowledge-related assets. These assets are related to the best ways to do jobs, knowledge related to team work and knowledge stored in company products, processes and relationships (King, 2009).

Knowledge management is composed of several other management fields such as performance measurement, change management, human resources, information technology and valuation (Bueno, 2002; Bukowitz and Williams, 2000; Pablos, 2003). Intellectual capital is produced from knowledge management because intellectual capital is value created from knowledge (Bassi, 1997). The art of creating value from intangible assets of one company is defined as knowledge management (Sveiby, 1997). Success of a company cannot be imagined without knowledge management. If a company does not implement its own knowledge management system, it may miss all possible opportunities. The most important factor in any company's business is knowledge management (Krogh, 2009). Successful knowledge management brings better knowledge practices, improved organizational behaviors, better decisions and improved performance to a company (King, 2009). Knowledge management stimulates company's intellectual capital that brings further better employees' innovativeness and creativity (Van Beveren, 2002).

The process of knowledge collection and implementation to the specific key innovation goals of one company is defined as knowledge management (Krogh and Grand, 2000; Nonaka, 1994, 1991; 2003; Wiig, 1995, 1993; Wiig et al., 2000). The biggest challenge of a company is how to codify and transfer explicit and tacit knowledge inside a company, among employees and departments (Lin, 2011). Koskinen (2004) maintains that differentiating between explicit and implicit knowledge inside a company is especially relevant and important. This study shows an important role of knowledge management because of a trust between company's employees and members.

4. KNOWLEDGE MANAGEMENT AND ITS LINK WITH INTELLECTUAL CAPITAL

Knowledge management is very strictly related with intellectual capital, and their relationship is very important for a company. The intellectual capital as a term cannot be seen as an accounting term, but it rather refers to 'capital' (Bukh et al., 2001). Boudreau and Ramstad (1997) associated intellectual capital with human resource management, while Davenport and Prusak (2010) linked intellectual capital to information technology. Intellectual capital is an invisible asset of a company and it is a value for the company (Hashim et al., 2015). Based on this definition, it can be concluded that management of knowledge generates or produces intellectual capital (Hashim et al., 2015). Knowledge management is a process inside a company, whereas intellectual capital covers all company's operations (Starovic and Marr, 2004).

Petty and Guthrie (2000) investigated the ways in which the information about intellectual capital supports and helps managers in the process of knowledge management application and implementation. Information about intellectual capital is closely related to the process of application, management, development and sharing of a company's knowledge (Drucker, 1993). Intellectual Capital Management (ICM) and Knowledge management (KM) are multidimensions and cover most of the fields in company's operations (Wiig, 1997). The relationship between knowledge management and intellectual capital management is to allow the present and future body of knowledge in order to secure long-term viability and profitability of a company (Wiig, 1997).

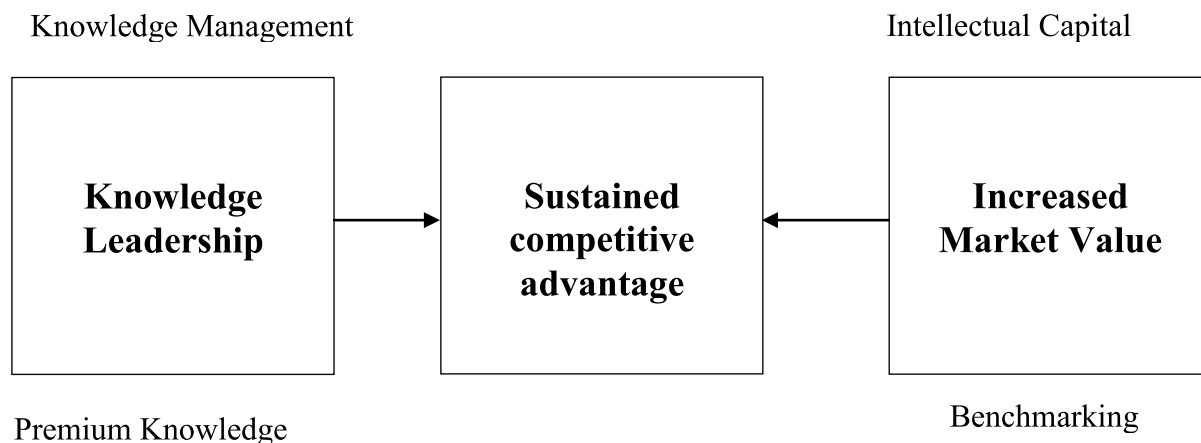


5. IMPROVING COMPETITIVE ADVANTAGE FROM SUCCESSFUL KNOWLEDGE MANAGEMENT

Knowledge management's main role is to create and develop sustainable competitive advantage by integrating knowledge from a company's premium knowledge base.

This allows for customers' needs to be fulfilled by reaching higher loyalty, brand awareness and higher profits and market value (Sullivan, 1998). Intellectual capital can be used for benchmarking a company's knowledge base in order to produce greater revenues and market value (see Figure 28 below) (Srivastava, 2001):

Figure 1. Creation of Sustained Competitive Advantage (Stainfield, 1998)



The difference between knowledge management and intellectual capital can be described as the fact that knowledge management system manages intellectual capital seen as a company's knowledge. The knowledge owned by a company is intellectual capital. Knowledge management as a function describes and explains the act of managing an object, which is intellectual capital (Petty and Guthrie, 1999, 2000).

6. CONCLUSION

Utilization of advanced information technology and business management result in the rise of knowledge economy. Knowledge intensive companies have gained competitive advantage in knowledge economy. Intellectual capital is the main factor for enhancing not only corporate financial performance, but also a company's market value (Bozbura, 2004). So far, various researchers have added intellectual capital as a production factor, along with land, labor and financial capital (Goh, 2005). In knowledge economy, the financial performance of a company is always under first observation, not only by internal users of financial information, but by external users as well. The company's financial performance is under the direct or indirect influence of invisible assets and resources posed by a particular company. Those invisible assets or resources are called intellectual capital. Various empirical studies proved that intellectual capital itself directly influences financial company performance.

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POSSIBILITIES OF USING BY-PRODUCTS IN THE CIRCULAR PRODUCTION PROCESS IN BIOGAS POWER PLANTS

Nikola Dražić*,
Gordana Dražić
Nikola Rakašćan

Singidunum University,
Belgrade, Serbia

Abstract:

A biogas power plant uses biomass (manure, silage) to produce biogas for energy conversion to electricity and heat and digestate as byproduct of the anaerobic digestion process. The production of first generation agro-energy crops, as basic raw materials for silage, should be organized on marginal land. The application of solid digestate on such land should enable an increase in yield of agro-energy crops, avoiding the use of mineral fertilizers. By applying this concept, advantages are achieved for the management of the biogas power plant through the reduction of operating costs (*economic advantages*): mineral fertilizer is substituted by a by-product from own production, a production chain is established on the nearest land; environmental significance (*environmental benefits*): reduced greenhouse gas emissions into the atmosphere; improving the production capacity of degraded land; and general social (*social advantages*): mitigation of climate change using renewable energy sources - biomass and improvement of production capacities (valorization) of degraded lands.

Keywords:

anaerobic digestion, bioeconomy, biomass, sustainability.

1. INTRODUCTION

Biogas power plant works on a base principle of using organic material as an entry substance to make energy in the form of biogas while co-products of the system are extracted and reused. This type of powerplant usually uses the process of Anaerobic digestion (AD). This process is based on a biochemical reaction that uses organic matter and with the help of microorganisms, in the absence of oxygen, produces a gas that is made of methane and carbon dioxide. The byproduct of this process is called digestate or sludge and it can contain certain chemical characteristics that can make it suitable for reuse in the fields of agriculture and farm industry (Maurer 2019; Li et al. 2017).

Feedstock for the biogas production is made from organic materials that are usually leftovers and are usually considered a waste. The main sources of feedstock materials are waste from industry, manure, leftover foods, wastewater plants sludge, energy crops, source-separated organics (SSO), municipal solid waste (MSW), and organic matter from landfills. Some feedstock needs to be treated before entering biogas plant production (De Meester et al. 2012). The environmental sustainability of anaerobic digestion as a biomass valorization technology. Production of biogas is done in the digestion tank by the process of anaerobic digestion. The biogas is created in one stream and it can be used for electrical energy production or as a renewable fuel for vehicles. Second product from the plant is extracted in the second stream and it's called digestate and usually, it can be used as a fertilizer or in the making of compost, if it is in solid form, or as reusable water for plants if it is a liquid form (Kirubakarana et al 2009).

Correspondence:
Nikola Dražić

e-mail:
n.drazic@yahoo.com



The market for biogas is constantly growing. The social demand for cleaner energy with less impact on the environment is making initiatives across Europe for more projects that reinforce renewable energy sources among which is a biogas production. According to Global Market Insights (gminsights.com), the market value for 2019 was more than \$45 billion and it is expected that this market value will grow and the prognosis for it is to reach more than \$75 billion by the year 2026. Those predictions are supported by the growth of circular economy projects in European Union countries and they as well have grown in the last decade.

Biogas production by the system of anaerobic digestion is a perfect example of a circular economy. In this sense the first generation of agro energy crops is used for a feedstock. This type of crops can be combined with agricultural waste or other organic matter forms agriculture to enhance the production of biogas. The digestate from the plant can be used as a fertilizer for other crops or it can be reintroduced in the process as a feedstock depending on the quality of digestate and mineral and organic composition of it. If agro energy crops are grown on marginal or degraded land, it is multi-beneficial for the farmer; firstly the process of reclamation of the land, lowering the waste of the crops that are usually not used, production of biogas that can be used for electricity production or as a fuel in farm machinery, and having fertilizer or compost from digestate (Amen et al. 2017). This system looks similar to natural processes that happen in ecosystem and it is a good example of that what the circular economy has as a goal, to recycle and reuse in order to lower waste and lower ecosystem footprint.

When the biogas power plant transforms biogas into electrical energy, and by the process of cogeneration, the result is 70% electrical and 30% of thermal energy that is re-used in the process of creating electrical energy in the plant (Bogdanov et al 2016).

Biogas production gives a sustainable way to produce clean energy by recycling input materials and producing minimal waste and by-products. Countries that use this type of energy production are in appliance with United Nations Sustainable Development Goals (SDG's) and as well, if in Europe, with European growth and development strategies (Scarlat et al 2018).

2. SOCIO-ECONOMIC ASPECTS

Since the beginning of the 21st century, the global awareness of fossil fuel usage and environmental impacts of it started to make changes in the way developed countries approach energy production. Social pressures started to point out the advantages of using renewable energy sources as well as the usage of green energy. Advocates for this approach pointed out not only the environmental impacts of cleaner energy production but the economic impacts as well (Prask et al 2018).

The circular economy is one way that is shown that can have a positive impact on the environment and empower workers in the industry in the sense that this type of economy connects different branches of industry and provides steady job opportunities. In this manner, yesterday's waste is today's input to the production process. Like in nature, the circular economy advocates the usage and re-usage of matter that was previously considered not to be usable anymore and aims to make a circular production cycle without waste, or at least, with less waste as it is possible (Cucchiella et al 2016).

If we look at the biogas production process only as making biogas in the biogas plant and take into consideration only the personnel that works at the plant, we would leave out the big part of the biogas production process. The correct way to look on the biogas production is to take into consideration all different sources that are included in the input of the plant. The agricultural industry takes a big part in feedstock production, mainly as a provider of agro energy crops of first-generation. If we utilize the production of agro energy crops on marginal lands, the valuable space for producing food is saved and there are possibilities for phytoremediation if correct crops are used (Scarlat et al 2019)

3. BIOGAS PLANT IN SERBIA

The Republic of Serbia started to incurring the production of green energy in the last decade with the program of state-initiated feeding tariffs. This trend was in accordance with the government's path to become a member of the European Union. This change in politics regarding energy production opened the way for new technologies and new jobs in the industry. The effort of creating more biogas plants was supported by the EU member states from which, Germany took the main initiative. According to Bioenergy Serbia (bioenergy-serbia.rs), there are 22 biogas plants currently operating in the Republic of Serbia with a total production of 21 MW. The production of energy from biogas is done in 59 biogas power plants that have been established since 2011 according to the registry of privileged energy producers in Serbia (mre.gov.rs/doc/registar-271219). As the establishment of biogas production plants and power-plants that use biogas have a rising trend and it is supported by the government, we can expect more energy production from this type of source and more job opportunities in this sector with the usage of new technologies.

As we mentioned previously, incorrect assumption would be to say that nowadays biogas plants are mostly automated and don't require skilled workers.

As the good practices and experience from EU countries like Germany, Czech Republic, Austria, Hungary and others, in production of biogas were taken, biogas plants in Serbia also transformed to better utilize technology and manpower.



Also, we need to understand that biogas production isn't only focused on personnel in the plant, it is focused, as well, on all workers that provide feedstock (from agriculture or other industries).

Feedstocks in biogas plants in Serbia are mainly from agro energy crops and agricultural waste. To have required biomass for the plant usage, it is needed to have developed agricultural industry regarding agro energy crops production and needed logistics for transportation and treatment of agricultural waste. Entry operations like growing agro energy crops, gathering agricultural waste, and treatment

of it require mostly low-skill workforce. Those operations are considered to be a part of the agriculture industry and are the most important for the production of biogas. When desired feedstock is gathered, it is sorted out on the factory grounds and prepared for the process of anaerobic digestion.



Picture 1. Biogas plant feedstock area, original source N.R. 2019.

The preparation stage requires low and medium-skill workers and the usage of heavy machinery. If the treatment of feedstock is needed, like in the case of manure or other types of agricultural waste, medium skill workers are needed along with the usage of chemical agents. By reusing leftovers, waste, or by-products of another industry, there are no expenses on storage, disposition, or destruction of those materials. The structure has been changed in a way that those materials become the biogas production lifeline, and the stance of losing money has changed for other industries since now they have a resource which empowers that industry and allows it to hire and maintain more workers.

The next stage in the biogas plant is the production of biogas. Inside the plant, all processes are highly mechanized and require high-skill workers to operate them. Anaerobic digestion is done in the digestion tank. Almost all processes from the input area are automatized until the end of the production. In those areas highly trained personnel watches over the process of the production. The biogas plant requires highly skilled technicians as well, in the case of malfunctions, or errors. Employees in this area need to be up to date with all safety standards and to have knowledge of the new components in the plants. Good practices and experiences from countries and companies that are leaders in this industry are constantly shared.



Picture 2. and 3. Biogas digestion tank (left) and electric generator (right), original source N.R. 2019

The final product is biogas that is mostly used for the production of electrical energy in Serbia. Biogas can also find usage in the production of thermal energy or as fuel. When using biogas to produce electrical energy, the production is based on cogeneration process with 70% of electrical energy made and 30% of heat. Cogeneration is needed to ensure profitability of producing electrical energy from biogas since without it, entire process would have financial losses. The by-product of producing biogas is called digestate. This substance can be used for multiple things depending on its quality; chemical and mineral characteristics. In Serbia, digestate is mainly used as a fertilizer. The biogas plant can sell its by-product to a third party, it can reuse it on its own agricultural land or sell it back to the providers of feedstocks. Previously, digestate was considered a waste and was deposited, and with the growth of the circular economy, the processes are continuously growing and expanding in a way to make a close-ended loop.

4. CONCLUSION

The circular economy is based on the natural cycle that is found in every ecosystem. The main idea is the implementation of the no-waste policy in human society. By transforming the waste into the resource, we are simultaneously encouraging growth in multiple industries while reinforcing the main industry. With the approach of the circular economy and new ways of thinking, there is an opportunity to create new industry branches while securing more jobs and promoting educational and professional growth.

Biogas plants are one of good example of producing green energy by the principles of the circular economy. Biogas plants can't stand without other industry inputs, the feedstock is needed for the production and they have a valuable

output that can be reused. Connectivity with other industries promotes new hiring as well as education in all branches. This results in bridging gaps among different types of industries and promotes new skills needed for making this complex system work. Taking into consideration all previously mentioned, production of biogas cannot be a standalone process, it combines the agricultural and energy industry with environment protection in circular economy.

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EMPIRICAL DATA ON FINANCIAL AND AUDIT REPORTS OF SERBIAN BUSINESS ENTITIES

Empirical data on financial and audit reports of Serbian business entities constitutes research work of PhD students at Singidunum University under supervision of professors Nemanja Stanišić and Vule Mizdraković. The data from 9,549 complete sets of annual financial statements are combined with the data from corresponding audit reports, forming an unbalanced panel data set. Client companies included in the sample represent a supermajority of medium and large-sized companies registered in the Republic of Serbia. Information on the name of auditing firm, the type of auditor, the date of audit and the type of audit opinion is hand-collected from audit reports issued by 77 audit firms (the Big 4 plus 73 other auditing firms), representing a supermajority of all auditing firms registered in this country.

The final sample comprises of 6,343 audit opinions in total where the following frequencies of the four main types of audit opinions are observed: an adverse opinion (50), a disclaimer of opinion (344), a qualified opinion (1,278), and an unqualified opinion (4,671). In addition, most common financial indicators are calculated based on the collected financial statements. Research results, in the form of adequate data base, are available on the site of Mendeley. Therefore, young researchers and other interested parties can freely use the database for their research. For more information, please read the paper.



EMPIRICAL DATA ON FINANCIAL AND AUDIT REPORTS OF SERBIAN BUSINESS ENTITIES

Vule Mizdraković^{1*},
Nenad Stanić¹,
Vladimir Mitić^{1,2},
Ana Obradović^{1,2},
Maja Kljajić^{1,2},
Maja Obradović^{1,2},
Nemanja Stanišić¹

¹Singidunum University,
Belgrade, Serbia

²PhD candidate,
Singidunum University,
Belgrade, Serbia

Abstract:

The aim of this paper is to create a one of a kind database that will provide basic information collected from financial and audit reports of companies that operated in the Republic of Serbia, during the observed period 2016-2018. Interested researchers can use all information presented within the database without additional permission, if they provide appropriate referencing of this paper while publishing their research results. Data contained in the database were collected manually from the official Internet website of the Business Registers Agency of the Republic of Serbia. The database shows a total of 9,549 annual observations, by years: 2016: 3,242, 2017: 3,197, 2018: 3,110. Most commonly used financial indicators that measure liquidity, solvency and profitability of observed companies were calculated and included in the database, but interested researchers will be able to calculate other indicators if needed. Information presented in the database can serve as a good basis for further analysis and research in the field of accounting, auditing and other multidisciplinary fields. Complete database can be found on the following link: <https://data.mendeley.com/datasets/x3z4zx8vwr/draft?a=2851c2e4-afc0-4d60-b2de-ce1fa1b27a30>.

Keywords:

database, financial indicators, financial statements, audit reports, Business Registers Agency.

1. INTRODUCTION

Financial and audit reports are the main source of information for business decision making process, as they contain key information about company's financial position, financial results, changes in equity, cash flows and other relevant information (Mrvaljevic, Dobricanin, & Đuricanin, 2014). These reports present significant source of data that can be used in scientific research, both in the field of economics and in multidisciplinary research. Most important feature of financial and audit reports, as secondary sources of research, is their availability. Namely, the Law on Accounting of the Republic of Serbia requires from all legal entities to submit their reports to the Business Registers Agency, which are later disclosed on the Agency's official website (Official Gazette of the Republic of Serbia No. 73/2019, 2019). Law on Auditing of the Republic of Serbia prescribes mandatory audit of financial statements for: medium, large, parent legal entities for consolidated financial statements; and all other legal entities that recorded more than 4,400,000 euros of revenues in the previous reporting period (Official Gazette of the Republic of Serbia No. 73/2019, 2019). Main purpose of audit report is to increase the level of credibility of audited financial statements by disclosing audit opinion. Although information presented in both financial statements and audit reports could be used for different scientific purposes, the time needed to collect and pre-process information from the published reports can be very time and labor consuming.

Correspondence:
Vule Mizdraković

e-mail:
vmizdrakovic@singidunum.ac.rs



Namely, all reports have to be downloaded manually and individually, afterwards each value needed for research have to be copied and recorded in pre-set tables suitable for the analysis. Therefore, main goal of this paper is to provide a database that contain empirical data related to financial and audit reports of Serbian business entities that will be available and ready to use by all interested researchers.

2. RESEARCH METHODOLOGY

Research sample consists of mostly medium and large business entities that were selected by random. Financial statements and related audit reports have been downloaded manually from the official website of the Business Registers Agency. After that, data from the pdf files have been copied and recorded in pre-set up tables in Excel files. In addition, values originally disclosed in RSD, as the reporting currency, were converted into euros by using the average exchange rate of euros on the balance sheet date (31st December). Values in database will be presented in thousands, since they were originally disclosed in thousand RSD in financial statements. As mentioned above, not all business entities had audit reports publicly available, because financial statement audit is mandatory for selected entities.

When it comes to audit reports, following information was recorded: name of audit company, name and surname of the auditor that signed the report and report date. It is important to mention that some entities were not subject to audit or simply did not publish audit reports, therefore NA (Not Available)¹ have been entered for them in the corresponding cells. Errors in stated date of the report were noticed in several audit reports and were corrected accordingly. Total number of auditing companies hired by sampled entities is 77, and they were divided by type to: local, international² and Big 4 companies. Namely, all audit companies operated within the territory of Republic of Serbia, but the first group are the ones that do not belong to an international group (parent company or subsidiary). Numerous authors (Berglund, Eshleman, & Guo, 2018) (Fargher, Jiang, & Yu, 2017) (Gaynor, Kelton, Mercer, & Yohn, 2016) (Swanquist & Whited, 2015) investigated the association between the size and methodology used by auditing companies and audit quality and other aspects of audit client business. Some of them found an evidence that Big 4 companies provide audits of higher quality (Eshleman & Guo, 2014). Therefore, dividing audit companies to Big 4, international and local might be helpful for all authors that will use database as a result of this research.

According to the revised version of International Standard on Auditing (ISA) 700 - Forming an Opinion and Reporting on Financial Statements, auditors have an obligation to clearly state in a separate paragraph which audit opinion type is declared within the audit report (IAASB, 2015). Therefore, authors have been able to discern which audit opinion type client received without any issues in most cases. Opinion types have been divided to four groups: Unqualified Opinion, Emphasis of Matter Paragraphs, Qualified Opinion, Disclaimer of Opinion and Adverse Opinion. Afterwards, gender of a signatory of the report has been determined based on the name of the auditor. This information can be of interest to researchers that focus on the gender equality within audit companies or even the correlation between audit opinion type and gender of report signatory. There has been one report where auditor name was missing; therefore, gender could not be determined.

Basic information on sampled business entities, such as identification number and the name of the entity have been collected. Afterwards, financial statement items from Balance Sheet, Income Statement and Statement on Cash Flows for reporting period 2016-2018 have been recorded. Those three statements have been selected since the most common financial indicators are calculated based on the information from those statements. Financial statement items will be presented in database by using corresponding automatic data processing number (*in Serbian*: Automatska obrada podataka – AOP), that belong to the national nomenclature system. Balance sheet items cover automatic data processing numbers from 0001 to 0465, income statement from 1001 to 1071 and statement of cash flows from 3001 to 3047. Table 1 shows the formulas used for the calculation of the financial indicators present in the dataset³.

1 This will be used for all values that were missing in the reports, or when calculated values of financial indicators are infinite.

2 Also known as mid-tier audit companies.

3 Interpretations of selected financial indicators can be found here: (Knezevic, Stanisic, & Mizdrakovic, 2017).



Table 1. Calculation of selected financial indicators

Financial indicator	Calculation
Total Assets	AOP 0071
Net Equity	AOP 0401
Operating Revenue	AOP 1001
Operating Result	AOP 1030 (gain) or AOP 1031 (loss)
Net Result	AOP 1064 (gain) or AOPP 1065 (loss)
EBIT	(AOP 1058 or AOP 1059) + AOP 1046
EBITDA	(AOP 1058 or AOP 1059) + AOP 1046 + AOP 1027
NOPLAT	EBIT \times (1 – corporate tax rate)
Debt Ratio	(AOP 0424 + AOP 0441 + AOP 0442) / AOP 0071
Interest Bearing Debt Ratio	(AOP 0432 + AOP 0443) / AOP 0071
Working Capital	AOP 0043 - AOP 0442
Current Ratio	AOP 0043 / AOP 0442
Acid Test Ratio	(AOP 0043 - AOP 0044 - AOP 0069 - AOP 0070) / AOP 0442
Cash Ratio	AOP 0068 / AOP 0442
Net Margin	(AOP 1064 - gain or AOP 1065 - loss) / AOP 1001
Return on Equity (ROE)	(AOP 1064 - gain or AOP 1065 - loss) / AOP 0401
Operating Margin	(AOP 1030 - gain or AOP 1031 - loss) / AOP 1001
Return on Assets (ROA)	(AOP 1030 - gain or AOP 1031 - loss) / AOP 0071
Excess Cash	Excess amount of: AOP 0068 – (3% \times AOP 1001) ⁴
Return on Invested Capital	EBIT \times (1 – corporate tax rate) / (AOP 0401 + AOP 0432 + AOP 0443 – Excess Cash)
Return on Core Assets	(AOP 1030 - gain or AOP 1031 - loss) / (AOP 0071 - AOP 0024 - AOP 0062 - Excess Cash)
Days Sales Outstanding	AOP 0051 / (AOP 1002 + AOP 1009) \times 365 / 1.2 ⁵
Days Payable Outstanding	AOP 0451 / (AOP 1019 + AOP 1020 + AOP 1021 - AOP 1022 + AOP 1023 + AOP 1024 + AOP 1026 + AOP 1029) \times 365
Days of Inventory	(AOP 0045 + AOP 0046 + AOP 0047 + AOP 0048) / (AOP 1019 + AOP 1020 + AOP 1021 - AOP 1022 + AOP 1023) \times 365 \times 1,2
Cash Conversion Cycle	Days Sales Outstanding - Days Payable Outstanding + Days of Inventory
Z-score Private Companies	$0.717 \times ((\text{AOP } 0043 - \text{AOP } 0442) / \text{AOP } 0071) + 0.847 \times (\text{AOP } 0417 / \text{AOP } 0071) + 3.107 \times (\text{EBIT} / \text{AOP } 0071) + 0.420 \times (\text{AOP } 0401 / (\text{AOP } 0424 + \text{AOP } 0441 + \text{AOP } 0442)) + 0.998 \times (\text{AOP } 1001 / \text{AOP } 0071)$
Z-score Non-manufacturing Firms and Emerging Markets	$6.56 \times ((\text{AOP } 0043 - \text{AOP } 0442) / \text{AOP } 0071) + 3.26 \times (\text{AOP } 0417 / \text{AOP } 0071) + 6.72 \times (\text{EBIT} / \text{AOP } 0071) + 1.05 \times (\text{AOP } 0401 / (\text{AOP } 0424 + \text{AOP } 0441 + \text{AOP } 0442))$
Free Cash Flow to Equity (FCFE)	AOP 3047 - AOP 3044 + AOP 3037 + AOP 3032 - AOP 3026
Free Cash Flow to Firm (FCFF)	FCFE - AOP 3027 - AOP 3028 + AOP 3033 + AOP 3034 + AOP 3008 \times (1 – corporate tax rate)
Interest Coverage Ratio	EBIT / AOP 1046
Fixed Assets in Total Assets	AOP 0002 / AOP 0071
Dividend Payout Ratio	AOP 3037 / (AOP 1064 – AOP 1065)
Effective Tax Rate	AOP 1060 / AOP 1058
Interest Rate on Interest-bearing Debt	AOP 1046 / (AOP 0432 + AOP 0443)
Implied Growth Rate	ROE \times (1 - Dividend Payout Ratio)
Sustainable Growth Rate	$(\text{Net Margin} \times (1 - \text{Dividend Payout Ratio}) \times (1 + ((\text{AOP } 0424 + \text{AOP } 0441 + \text{AOP } 0442) / \text{AOP } 0401))) / (\text{AOP } 0071 / \text{AOP } 1001 - (\text{Net Margin} \times (1 - \text{Dividend Payout Ratio}) \times (1 + ((\text{AOP } 0424 + \text{AOP } 0441 + \text{AOP } 0442) / \text{AOP } 0401))))$

⁴ 0 if the value is negative.

⁵ Account Receivables includes VAT of 20% in the Republic of Serbia, however sales revenues do not include VAT. Therefore, coefficient 1.2 is used to exclude that amount from the amount of receivables.



3. RESEARCH RESULTS

Descriptive statistics will be presented in this section. Dataset provided as a result of this research contains information from 9,549 annual financial statements and corresponding audit reports (where available).

Collected data have been used to calculate basic figures when it comes to financial and audit reports. Table number 2 shows following information per reporting period: number of processed reports, audit opinion type, auditor gender and auditor type.

Table 2. Basic information on audit reports included in the database

Reporting period	2016	2017	2018	Total
Financial statements	3,242	3,197	3,110	9,549
Audit reports	2,170	2,100	2,073	6,343
Unqualified opinion	1,101	1,093	1,137	3,331
Emphasis of matter paragraphs	446	454	440	1,340
Qualified opinion	478	414	386	1,278
Disclaimer of opinion	127	121	96	344
Adverse opinion	18	18	14	50
Male auditors	1,198	1,090	1,055	3,343
Female auditors	971	1,010	1,018	2,999
Audits performed by local audit firms	1,077	1,075	1,073	3,221
Audits performed by international audit firms	708	654	664	2,026
Audits performed by Big 4	385	371	336	1,092

Source: Authors' research

Most common audit opinion is unqualified, which together with opinions with emphasis of matter paragraphs consist 73.64% of total sample. Out of modified opinions, qualified opinion is the most common, as sample auditors gave 1,278 out of 1,672 modified opinions. Unsurprisingly, adverse opinion is the rarest out of all declared audit opinions. Audit clients from the sample received their audit reports in 140.73 days (or app. 4 months and 20 days). Average values per year were very close to previous value, 142.31 in 2016, 140.32 in 2017 and 139.51 in 2018. This lag is actually longer than the one recorded on 196 Serbian public companies of 117.46 days, back in 2015 (Obradovic, Mizdrakovic, & Avlijas, 2018). Explanation might be that audit firms were aware that public companies are more eager in getting audit reports because their future investments might depend on them. Furthermore, it can be noticed that there is almost a perfect balance in hiring auditors of both gender by Serbian audit clients. Namely, out of 6,343 audit reports, male auditors signed 3,343 (app. 52.7%) reports and female auditors (app. 47.3%) signed remaining amount.

Since 2015, after the financial crisis, the level of investments in Serbia has been growing, which is conducive to even greater reduction in unemployment and an increase in GDP (Jakopin, 2018). There is a positive trend here and it can be confirmed by the announcements provided by

previously mentioned Business Registers Agency (BRA). In 2016, entities earned 534,412 million dinars of positive net result, while in 2017 they earned 666,561 million dinars (about 32% more than previous year). Business entities in Serbia as a whole operated profitably in 2018 and achieved a positive net result of approx. RSD 500 billion. Namely, positive net result amounted to about RSD 746 billion while the loss amounted to about RSD 246 billion. In addition, in 2018; 60,566 companies operated with a profit (about 69%), while 27,272 (about 31%) operated with a loss. There is also a positive trend as the number of entities that had losses decreases: in 2016 (27,194) and in 2017 (26,592), while the number of companies operating with profit in 2016 (57,160) and in 2017 increases (59,131).

Median values of calculated financial indicators that measure profitability of sampled Serbian entities confirm previously stated. Net result of sampled entities remained positive during the observed period; it increased by approx. 22% in 2017 and then decreased in 2018. Median values of operating result however recorded a decrease of approx. 13% from 2016 to 2018. Previous suggests that sampled entities recorded positive result from financing and other (non-business) related activities, which ultimately resulted in an increase of net result. It is interesting to notice that despite the volatility of net result,



median value of net margin remained the same during the period, close to 1%, which means that net result followed changes of sales revenue.

Although sampled entities were profitable, they were not highly liquid at the same time. Namely, average values of current and acid test ratios might lead to conclusion that sampled entities are liquid (average value of current ratio reaches approx. 1.5), however median values reveal that their amount is lower than required 2 and 1, respectively. Bankrupt entities close to the end of bankruptcy proceedings usually have high amounts of cash and cash equivalents as they already liquidated

their assets, therefore values of cash they own are actually extreme values in this dataset. Previous might be an explanation why there is such a high discrepancy between average and median values of indicators that measure liquidity. When it comes to the return on invested assets and equity, their median values recorded a decrease of approx. 1% during the period (approx. 3% for ROA and approx. 6% for ROE). It is interesting to notice that values are close to the ones reported by (Stanisic, Radojevic, Mizdrakovic, & Stanic, 2012) back in 2011; and much lower than the ones from 2008 when ROE was close to 20% of entities from Belgrade region.

Table 3. Median values of selected financial indicators

Financial indicator	2016	2017	2018
Operating result	166.65	150.54	145.12
Net result	103.97	126.71	112.73
Net margin	.75	.81	.80
Debt ratio	.53	.52	.52
Current ratio	1.28	1.32	1.32
Acid test ratio	.74	.76	.76
ROA	4.12%	3.56%	3.15%
ROE	7.49%	7.59%	6.25%

Source: Authors' research

4. CONCLUSION

Information contained in financial statements and audit reports are almost mandatory for any kind of research within finance, accounting, auditing and other fields. Although those reports are available for the public in the Republic of Serbia, interested researchers are not able to acquire needed information for a higher number of business entities without significant amount of time and labor. Research results of this paper provide unique database that is available for use by all interested users, with a condition of appropriate referencing in their scientific papers. Database contains information from 9,549 annual financial statements and 6,343 corresponding audit reports of business entities that operated during 2016-2018 reporting period. Additionally, interested researchers will be able to calculate any financial indicator that is calculated by using any item from Balance Sheet, Income Statement and Statement of Cash Flow. Combined with the information from corresponding reports, data can be used to inspect different aspects related to audit quality, earnings management, prediction of bankruptcy proceedings and others. Beside fellow researchers and PhD students, potential users of this database might be management of audit companies and other business entities, financial institutions, tax authorities, financial market analysts, etc.

Finally, some of the most common financial indicators have been calculated and included in the database, as potential researchers will most likely use them in their research. Brief analysis of the information shows that business entities operated with profit during the observed period; however, median values of liquidity indicators are below required level. Approximately three quarters of audit clients received unqualified opinion, local audit companies have performed half of audits, and there is almost a perfect balance when it comes to the gender of auditor in charge.

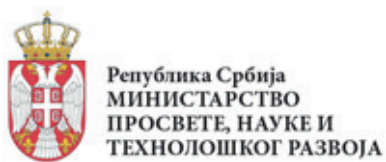
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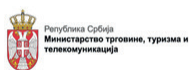


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336.225.68(4-67)(082)
005.21:334.72.021]:004(082)
62-52(082)
658.15:[007:004(082)
657:004(082)
343.359.2(4-67)(082)

SINGIDUNUM University. International Scientific Conference FINIZ (2020 ; Beograd)

People in the center of process automation : book of proceedings / Singidunum University International Scientific Conference FINIZ, Belgrade, December 4, 2020. - Belgrade : Singidunum University, 2020 (Belgrade : Caligraph). - 198 str. : graf. prikazi, tabele ; 24 cm

Tiraž 60. - Bibliografija uz svaki rad.

ISBN 978-86-7912-737-2

а) Финансије -- Управљање -- Информациона технологија -- Зборници б) Рачуноводство -- Информациона технологија -- Зборници в) Корпоративно управљање -- Информациона технологија -- Зборници г) Кривично дело пореске утаје -- Вишеградска група -- Зборници д) Аутоматизација -- Зборници

COBISS.SR-ID 25699081

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ISBN: 978-86-7912-737-2

