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CONTENT

RESEARCH, REVIEWS AND STUDIES

SADRŽAJ

ISTRAŽIVANJA, OGLEDI I STUDIJE

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Original Scientific Article

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EVALUATION OF TRADE EFFICIENCY IN SERBIA BASED ON DEA SUPER-RADIAL METHOD

ABSTRACT: The issue of measuring and analyzing the dynamics of financial performance and trade efficiency is continuously current, significant, and complex. Based on the previously stated, this paper measures and analyzes the financial performance and efficiency of trade in Serbia using the DEA (Data Envelopment Analysis) Super-Radial model. According to the results of the Super-CCR-I model in the period 2002 -2021 trade in Serbia was not efficient in any year. According to the results of the Super-CCR-O model Serbia's trade in the period 2002 -2021 trade was not efficient in any year. As a result, it was necessary to manage the analyzed input-output elements more efficiently. According to the obtained results of the Super-BCC-I model in the period 2002 - 2021, trade in Serbia was efficient in 2020 and 2021. In other years it was ineffective, among other things, due to poor management of the observed input-output elements. According to the results of the Super-BCC-O model, Serbia's trade in the period 2002 - 2021 was efficient in 2002 and 2015. In other years, among other things, due to inadequate management of the observed input-output elements, it was ineffective. To improve the financial performance and efficiency of trade in Serbia in the future, it is necessary, in addition to other solutions, to manage input-output elements (human resources, assets, capital, sales, and net profit) as efficiently as possible.

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Digitalization of the entire business plays a significant role in this. Likewise, it is necessary to greatly mitigate the negative effects of the energy crisis.

Key words: efficiency, factors, DEA Super-Radial models, Serbian trade

INTRODUCTION

It is very challenging to research the dynamics of the efficiency of all economic sectors, which means trade, based on a strategic profit model (Berman et al., 2018; Levy et al., 2019, Lovreta & Petković, 2021, Lukić, 2011), DEA (Data Envelopment Analysis), as well as the multi-criteria decision-making method (Ersoy, 2017). Based on the previously stated, the subject of research in this paper is the measurement and analysis of the dynamics of trade efficiency in Serbia based on the DEA (Data Envelopment Analysis) Super-Radial model. The aim and purpose of this is to indicate the years when trade in Serbia was and was not financially efficient as well as to improve it in the future by taking appropriate measures. There is a very rich literature devoted to the specifics and effects of the application of the strategic profit model in trade. There is also a rich literature devoted to the development of DEA models (Andersen & Petersen, 1993; Banker et al., 1984; Chen et al., 2021, Chang & Wang, 2020; Guo et al., 2020; Lee et al., 2011; Lin et al., 2020; Pendharkar, 2021; Tone, 2002; Dobrovič et al., 2021; Podinovski & Bouzdine-Chameeva, 2021; Rostamzadeh et al., 2021). The components of the strategic profit model are often used as input-output elements in the DEA model. Because they fully correspond to the very nature of trade and are a good measure of its performance (Berman et al., 2018). Likewise, an increasing number of research papers are dedicated to the specifics of the analysis of the efficiency of trading companies based on the DEA model (Ko et al., 2017; Baviera-Puig et al., 2020; Fenyves & Tarnóczi, 2020; Shuangyan et al., 2018; Pachar et al., 2021). In the relevant literature in Serbia, significant attention has recently been paid to the application of the DEA model in the evaluation of the efficiency of trading companies in Serbia (Lukic, & Hadrovic Zekic, 2019; Lukic et al., 2020; Lukic, 2021, 2022a,b,c,d; 2023a,b,c,d,f,g,h,i,j,k,l). In this paper, all relevant literature serves as a theoretical-methodological and empirical basis for measuring and analyzing the dynamics of financial performance and trade efficiency in Serbia using the DEA model. The basic research hypothesis in this work is based on the fact that knowing the real

situation regarding the efficiency of trade in Serbia is a prerequisite for improvement in the future and taking appropriate measures. The application of the DEA model plays a significant role in this. To research the problem treated in this paper, empirical data were collected from the Agency for Business Registers of the Republic of Serbia. With this regard, it should be emphasized that there are no restrictions in terms of international comparability because the empirical data were "produced" by relevant international standards.

METHODOLOGY

The research on the efficiency of trading companies in Serbia in this paper is based on the application of the DEA Super-Radial model. Considering that, we will briefly point out the methodological features. Suppose there are *n* DMUs {DMU $_j$ (j = 1, 2, ..., n)}. Each consumes a set of *m* inputs, x_{ij} (i =1, 2, ..., m), in the production of a set *of s* outputs, Y_{rj} (r =1, ..., s). Based on the VRS (variable return to scale) model (Banker et al., 1984), the input-oriented VRS super-efficient efficiency measurement model can be expressed as:

$$\begin{aligned} &\min \quad \theta \\ &s.t \sum_{\substack{j=1 \\ j \neq k}}^{n} \lambda_j x_{ij} \leq \theta x_{ik}, \qquad i = 1, \dots, m \\ &\sum_{\substack{j=1 \\ j \neq k}}^{n} \lambda_j y_{rj} \geq y_{rk}, \qquad r = 1, \dots, s \qquad (1) \\ &\sum_{\substack{j=1 \\ j \neq k}}^{n} \lambda_j = 1 \\ &\lambda \geq 0, \quad j \neq k \end{aligned}$$

In this paper, the sample includes all trading companies in Serbia that are required to submit annual financial reports. Data for the research in this work were, consequently, collected from the annual financial reports regularly published by the Agency for Economic Registers of the Republic of Serbia.

RESULTS AND DISCUSSION

In this work when measuring and analyzing the dynamics of financial performance and trade efficiency in Serbia, the following elements are used as input elements: number of employees, assets, and capital, and the following as output elements: sales and net profit. The given elements fully correspond to the very nature of trade operations, belong to adequate measures of financial performance and efficiency, and are elements (statistical variables) of the strategic profit model (Berman et al., 2018; Levy et al., 2019). DMU units were observed in the years 2002 - 2021. Table 1 shows the input/output data. (In this paper, all calculations and results are performed by the author)

Table 1. Input/Output data

DMU	(I) Number of employees	(I) Assets	(I) Capital	(O) Sales	(A) Net profit
2002	159881	408777	155219	538446	7291
2003	173615	511466	176372	678953	12444
2004	173529	739522	214201	956885	23540
2005	179895	1267296	582530	1220051	45310
2006	187028	1440435	676899	1531190	70878
2007	205215	1832673	790197	1971676	90281
2008	215540	2101239	796758	2364978	84995
2009	208595	2206975	803361	2243762	74201
2010	202585	2080584	596110	2495934	80709
2011	199718	2152946	664968	2689107	91637
2012	193954	2979785	716558	2979785	93687
2013	193210	2160474	746992	2891518	89730
2014	191621	2157564	761305	2594602	86955
2015	159621	2197931	805009	2731999	95265
2016	206092	2324843	859749	3009651	105238
2017	208020	2375290	920992	3172393	122727
2018	219373	2524897	1007972	3361094	121816
2019	222049	2682931	1073056	3608329	139409
2020	227618	2837599	1183026	3664505	171010
2021	234727	3166529	1318126	4754169	170703

Note: Data are expressed in millions of dinars. The number of employees is expressed as a whole number. I - input. O – output.

Source: Agency for Economic Registers of the Republic of Serbia

Table 2 shows the statistics of input / output data. (All calculations and images in the paper are created by the author).

Table 2. Statistics of Input/Output Data

Statistics on Input/Output Data					
	Number of employees	Assets	Capital	Sale	Net profit
Max	234727	3166529	1318126	4754169	171010
Min	159621	408777	155219	538446	7291
Average	198094.3	2007488	742470	2472951	88891.3
SD	20700.9	754874.9	297192.7	1050511	43507.28
Correlation					
	Number of employees	Assets	The capital	Sale	Net profit
Number of employees	1	0.764504	0.828861	0.786519	0.826354
Assets	0.764504	1	0.910381	0.954395	0.919411
The capital	0.828861	0.910381	1	0.928101	0.969566
Sale	0.786519	0.954395	0.928101	1	0.95926
Net profit	0.826354	0.919411	0.969566	0.95926	1
No. of DMUs	20				

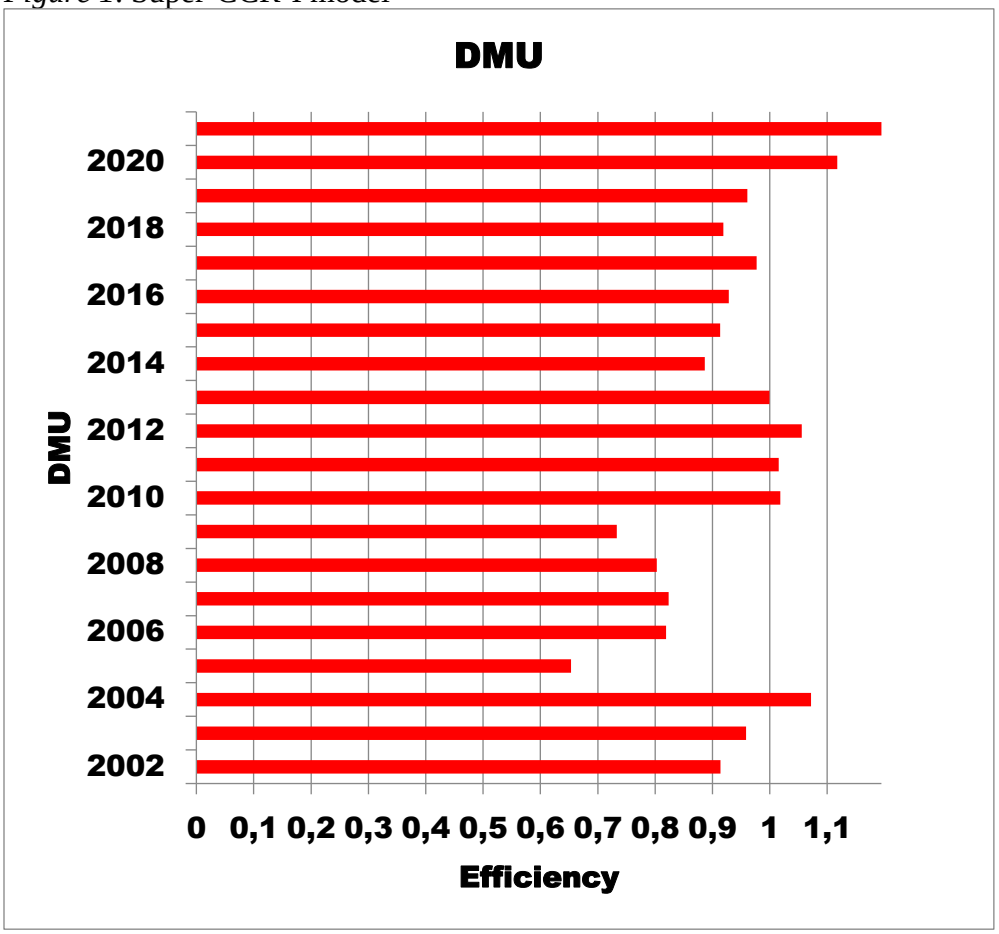
Therefore, the correlation between input-output elements is significant at the level of statistical significance. By applying the DEA Super-Radila methods of input and output orientation with constant and variable returns, we will look at the dynamics of trade efficiency in Serbia. Table 3 and Figure 1 show the results of the Super-CCR-I model.

Table 3. Results of the Super-CCR-I model

Model Name = DEA-Solver LV(V7)/ Super-Radial (Super-CCR-I) Returns to Scale = Constant (0 =< Sum of Lambda < Infinity)			
No.	DMU	Score	Rank
1	2002	0.913783	13
2	2003	0.958911	10
3	2004	1.072036	3
4	2005	0.653157	20
5	2006	0.819101	17
6	2007	0.823577	16
7	2008	0.80306	18
8	2009	0.733096	19
9	2010	1.018263	5
10	2011	1.015643	6
11	2012	1.055739	4
12	2013	0.999466	7
13	2014	0.886836	15
14	2015	0.913166	14
15	2016	0.928232	11
16	2017	0.976867	8
17	2018	0.919102	12
18	2019	0.960945	9

19	2020	1.117925	2
20	2021	1.194639	1
	Average of scores =	0.938177	
	No. of efficient DMUs =	0	
	No. of inefficient DMUs =	20	
	No. of over-iteration DMUs =	0	

Figure 1. Super-CCR-I model



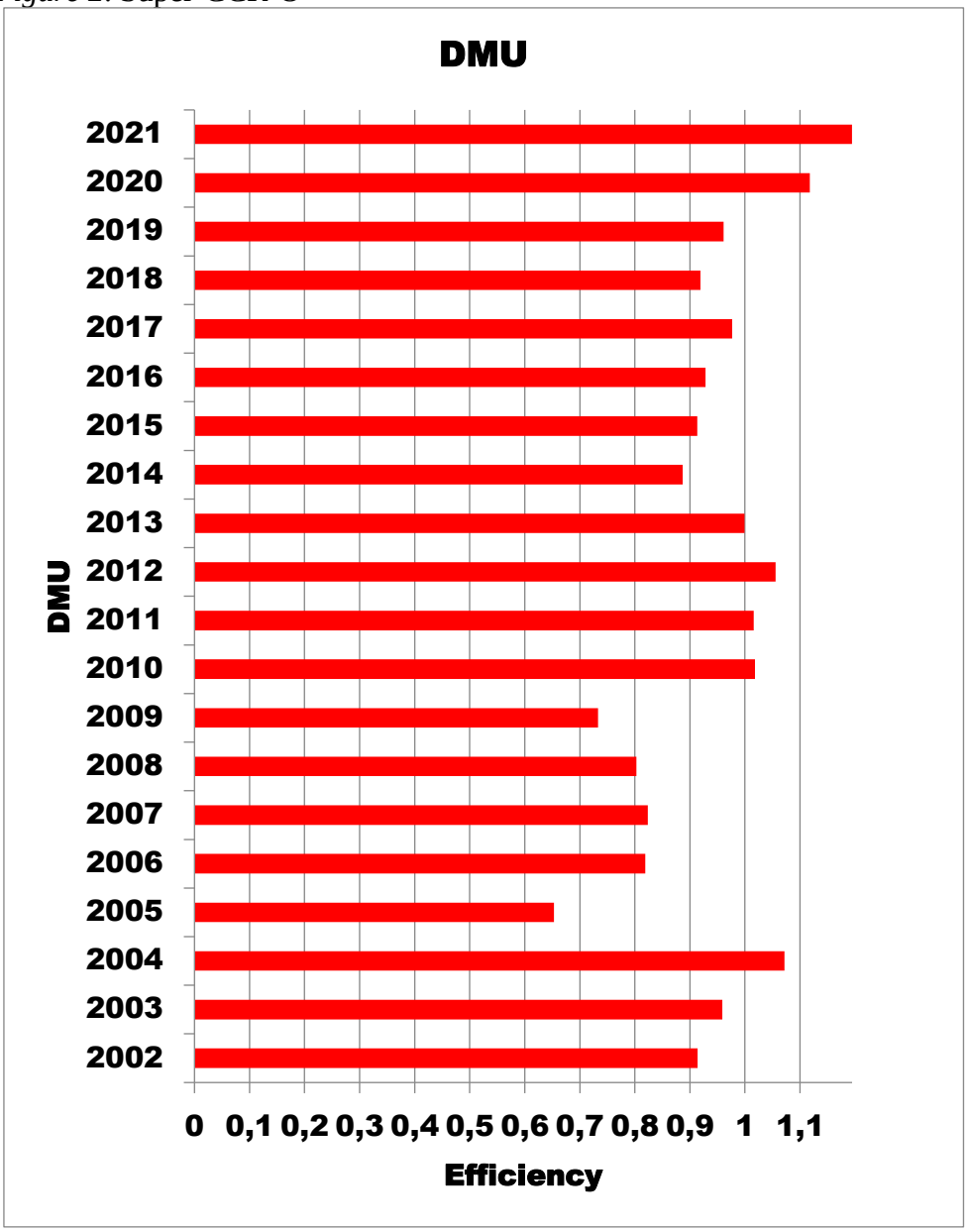
In the case when the score is equal to 1, the DMU unit is effective. If this is not the case, the DMU unit is ineffective. The score value can be greater or less than 1. According to the score value, the DMU units are ranked, starting from the largest to the smallest. The explanation of the results is the same for DEA models of input and output orientation with constant and variable

returns. In the specific case, according to the results of the Super-CCR-I model in the period 2002 - 2021 trade in Serbia was not efficient in any year. Therefore, it was necessary to manage the observed input-output elements more effectively because they are the efficiency factors. Table 4 and Figure 2 show the results of the Super-CCR-O model.

Table 4. Super-CCR-O model results

Model Name = DEA-Solver LV(V7)/ Super-Radial (Super-CCR-O) Returns to Scale = Constant (0 =< Sum of Lambda < Infinity)			
No.	DMU	Score	Rank
1	2002	0.913783	13
2	2003	0.958911	10
3	2004	1.072036	3
4	2005	0.653157	20
5	2006	0.819101	17
6	2007	0.823577	16
7	2008	0.80306	18
8	2009	0.733096	19
9	2010	1.018263	5
10	2011	1.015643	6
11	2012	1.055739	4
12	2013	0.999466	7
13	2014	0.886836	15
14	2015	0.913166	14
15	2016	0.928232	11
16	2017	0.976867	8
17	2018	0.919102	12
18	2019	0.960945	9
19	2020	1.117925	2
20	2021	1.194639	1
	Average of scores =	0.938177	
	No. of efficient DMUs =	0	
	No. of inefficient DMUs =	20	
	No. of over-iteration DMUs =	0	

Figure 2. Super-CCR-O

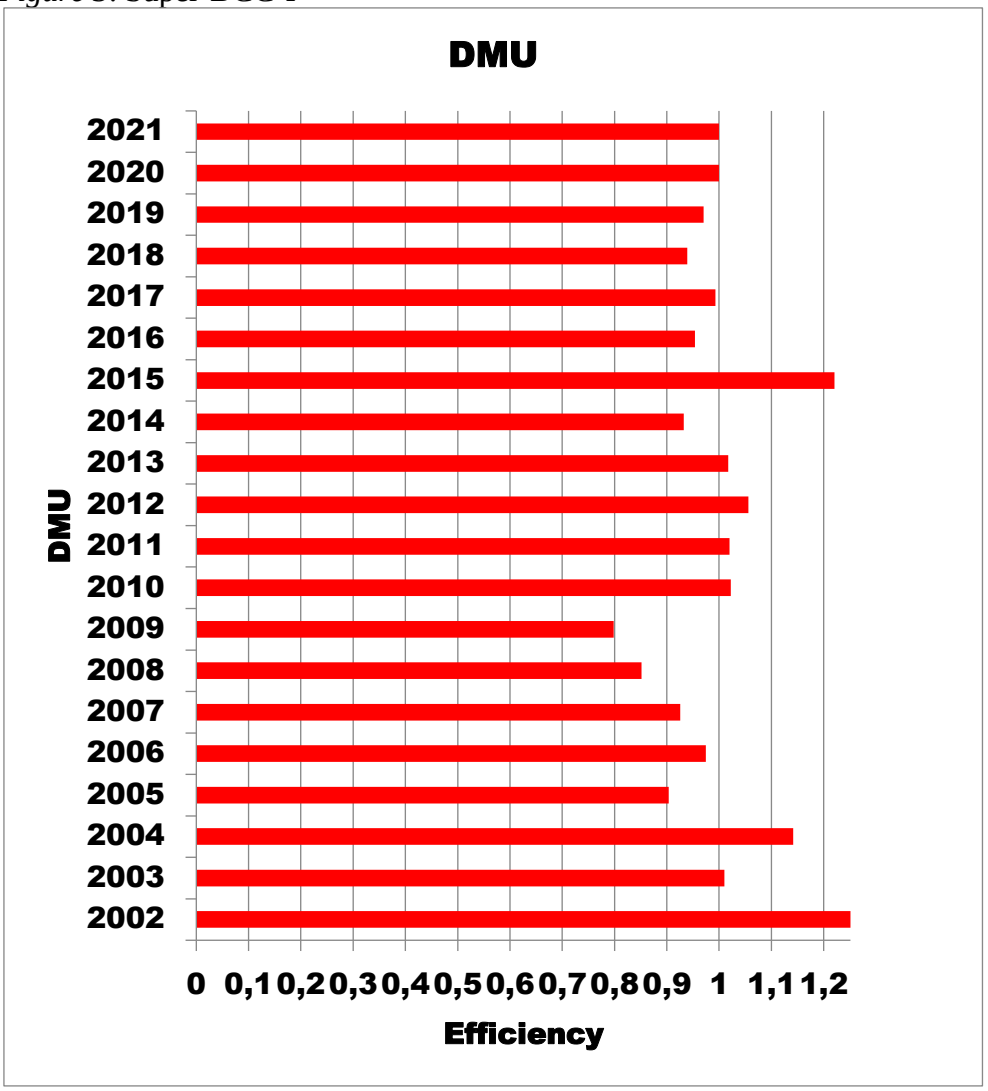


According to the results obtained, the Super-CCR-O model shows that Serbia's trade in the period 2002 - 2021 was not efficient in any year. So, it was necessary to manage the analyzed input - output elements more effectively. Table 5 and Figure 3 show the obtained results of the Super-BCC-I model.

Table 5. Results of the Super-BCC-I model

Model Name = DEA-Solver LV(V7)/ Super-Radial (Super-BCC-I) Returns to Scale = Variable (Sum of Lambda = 1)			
No.	DMU	Score	Rank
1	2002	1.251198	1
2	2003	1.010164	8
3	2004	1.141902	3
4	2005	0.903617	18
5	2006	0.974572	12
6	2007	0.925599	17
7	2008	0.851341	19
8	2009	0.798296	20
9	2010	1.022192	5
10	2011	1.020017	6
11	2012	1.056007	4
12	2013	1.017647	7
13	2014	0.932571	16
14	2015	1.220704	2
15	2016	0.953628	14
16	2017	0.992674	11
17	2018	0.938986	15
18	2019	0.970191	13
19	2020	1	9
20	2021	1	9
	Average of scores =	0.999065	
	No. of efficient DMUs =	2	
	No. of inefficient DMUs =	18	
	No. of over-iteration DMUs =	0	

Figure 3. Super-BCC-I

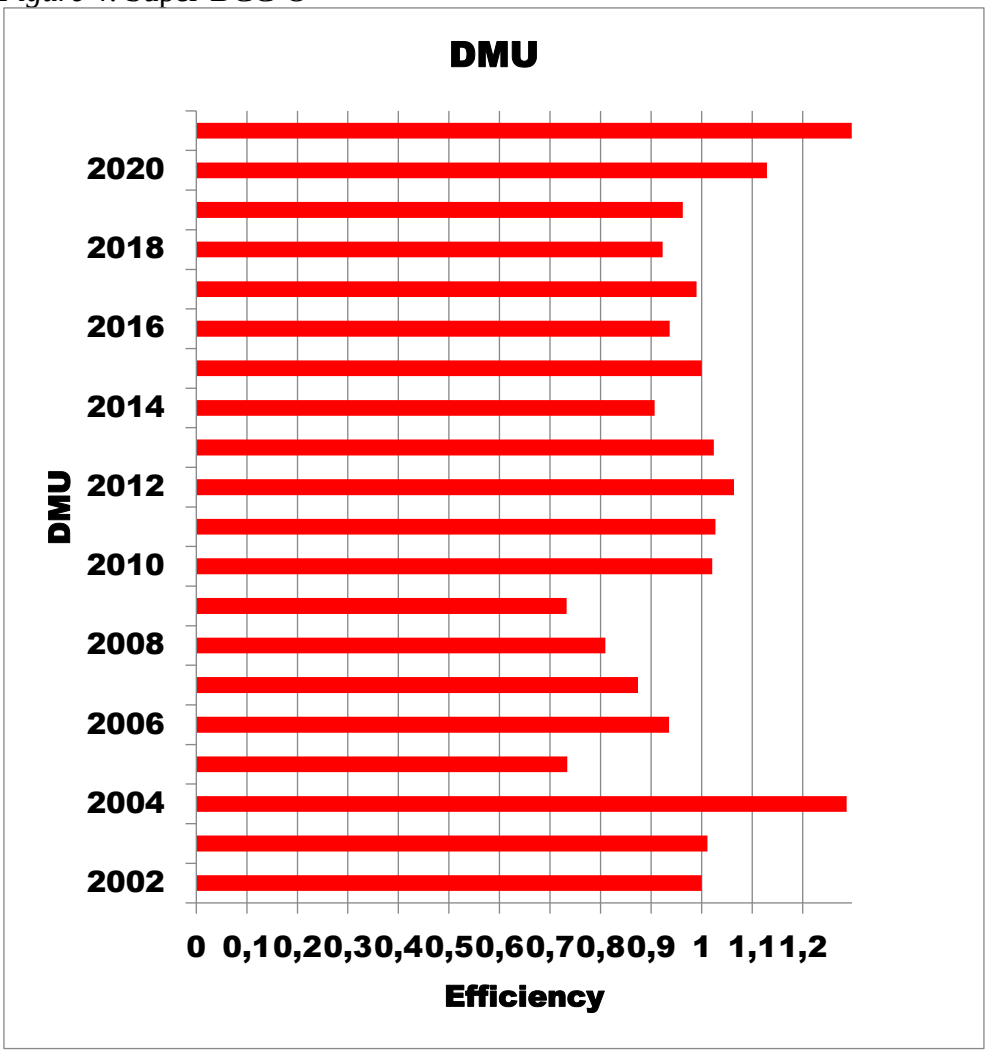


According to the results obtained, the Super-BCC-I model has a Super-BCC-I model in the period 2002 - 2021. Trade in Serbia was efficient in 2020 and 2021. In other years, it was ineffective due to poor management of the observed input-output elements. Table 6 and Figure 4 shows the obtained results of the Super-BCC-O model.

Table 6. Results of the Super-BCC-O model

Model Name = DEA-Solver LV(V7)/ Super-Radial (Super-BCC-O) Returns to Scale = Variable (Sum of Lambda = 1)			
No.	DMU	Score	Rank
1	2002	1	9
2	2003	1.011191	8
3	2004	1.287215	2
4	2005	0.733904	19
5	2006	0.935362	14
6	2007	0.874211	17
7	2008	0.809376	18
8	2009	0.733104	20
9	2010	1.021063	7
10	2011	1.027279	5
11	2012	1.064285	4
12	2013	1.023945	6
13	2014	0.907037	16
14	2015	1	9
15	2016	0.937049	13
16	2017	0.990189	11
17	2018	0.92264	15
18	2019	0.962512	12
19	2020	1.129502	3
20	2021	1.297356	1
	Average of scores =	0.983361	
	No. of efficient DMUs =	2	
	No. of inefficient DMUs =	18	
	No. of over-iteration DMUs =	0	

Figure 4. Super-BCC-O



According to the results of the Super-BCC-O model, Serbia's trade in the period 2002-2021 was efficient in 2002 and 2015. In other years, due to inadequate management of the observed input-output elements, it was ineffective. There are numerous factors of trade efficiency in Serbia. These are economic and political climate, foreign direct investments, new business models ((multichannel sales, sales of organic products, private label, etc.), modern concept of cost management (for example, activity-based costing), product categories, and customers, the concept of sustainable development, efficient management of human resources, assets, capital, sales and profit, energy crisis, digitalization of the entire business, etc. The target profit of trade in Serbia can be achieved to a large extent by its adequate control.

Table 7 shows the projection of input-output elements, in the example of the Super-BCC-O model. The analysis of the projection of input-output elements is similar to the other applied DEA Super-Radil models. The projection shows the deviation of the realized values from the projected input-output elements for each DMU unit and what measures should be taken to achieve the projected value of the input-output elements in the function of realizing the efficiency of each observed DMU unit.

Table 7. Projection

Model Name = DEA-Solver LV(V7)/ Super-Radial (Super-BCC-O) Returns to Scale = Variable (Sum of Lambda = 1)												
			(I) Number of employees		(I) Assets		(I) Capital		(O) Sales		(A) Net profit	
No.	DMU	Score	Projection	Change (%)	Projection	Change (%)	Projection	Change (%)	Projection	Change (%)	Projection	Change (%)
1	2002	1	159881	0.00%	408777	0.00%	155219	0.00%	538446	0.00%	7291.129	0.00%
2	2003	1.011191	163952.1	-5.57%	511466	0.00%	176372	0.00%	671438.7	-1.11%	12454.32	0.08%
3	2004	1.287215	173529	0.00%	633274.2	-14.37%	214201	0.00%	825654	-13.71%	18287.54	-22.31%
4	2005	0.733904	179895	0.00%	1267296	0.00%	510128.4	-12.43%	1662413	36.26%	61738.34	36.26%
5	2006	0.935362	187028	0.00%	1440435	0.00%	588313.4	-13.09%	1862725	21.65%	75776	6.91%
6	2007	0.874211	199590.3	-2.74%	1832673	0.00%	757770.7	-4.10%	2371097	20.26%	103271.4	14.39%
7	2008	0.809376	206109.2	-4.38%	2101239	0.00%	796758	0.00%	2921977	23.55%	105013	23.55%
8	2009	0.733104	208595	0.00%	2206975	0.00%	803361	0.00%	3060634	36.41%	104055.3	40.23%
9	2010	1.021063	193826.4	-4.32%	2080584	0.00%	596110	0.00%	2444446	-2.06%	79994.97	-0.88%
10	2011	1.027279	199718	0.00%	2152946	0.00%	664968	0.00%	2617699	-2.66%	89203.61	-2.66%
11	2012	1.064285	193954	0.00%	2120445	-28.84%	716558	0.00%	2799801	-6.04%	88028.15	-6.04%
12	2013	1.023945	193210	0.00%	2160474	0.00%	746992	0.00%	2823899	-2.34%	97041.53	8.15%
13	2014	0.907037	191621	0.00%	2157564	0.00%	761305	0.00%	2860524	10.25%	95867.07	10.25%
14	2015	1	159621	0.00%	2186925	-0.50%	801011.7	-0.50%	2734021	0.07%	95265	0.00%
15	2016	0.937049	206092	0.00%	2324843	0.00%	859749	0.00%	3211840	6.72%	112307.9	6.72%
16	2017	0.990189	208020	0.00%	2375290	0.00%	920992	0.00%	3203826	0.99%	123943	0.99%
17	2018	0.92264	217693.4	-0.77%	2524897	0.00%	1007972	0.00%	3642909	8.38%	132029.8	8.38%
18	2019	0.962512	221439.7	-0.27%	2682931	0.00%	1073056	0.00%	3748867	3.89%	144838.7	3.89%
19	2020	1.129502	225030.4	-1.14%	2837599	0.00%	1183026	0.00%	4126949	12.62%	151403	-11.47%
20	2021	1.297356	227618	-3.03%	2837599	-10.39%	1183026	-10.25%	3664505	-22.92%	171010	0.18%

In order to illustrate work and analysis of the projection, we will look only at the projection in 2021. To achieve the projected efficiency of trade in Serbia in 2021, it was necessary, through more efficient management of input-output elements, to reduce the number of employees by 3.03%, of assets by 10.39%, of capital by 10.25%, of sales by 22.92% and to increase net profit by 0.18%. The analysis of the projection for the other observed years is similar. Table 8 shows Slack.

Table 8. Slack

Model Name = DEA-Solver LV(V7)/ Super-Radial (Super-BCC-O) Returns to Scale = Variable (Sum of Lambda = 1)							
			Excess	Excess	Excess	Shortage	Shortage
No.	DMU	Score	Number of employees	Assets	The capital	Sale	Net profit
			S-(1)	S-(2)	S-(3)	S+(1)	S+(2)
1	2002	1	0	0	0	0	0.12939
2	2003	1.011191	9662.931	0	0	0	148.041
3	2004	1.287215	0	106247.8	0	82278.06	0
4	2005	0.733904	0	0	72401.57	0	0
5	2006	0.935362	0	0	88585.56	225723	0
6	2007	0.874211	5624.694	0	32426.35	115719.1	0
7	2008	0.809376	9430.85	0	0	0	0
8	2009	0.733104	0	0	0	0	2840.46
9	2010	1.021063	8758.6	0	0	0	950.8819
10	2011	1.027279	0	0	0	0	0
11	2012	1.064285	0	859339.9	0	0	0
12	2013	1.023945	0	0	0	0	9409.899
13	2014	0.907037	0	0	0	0	0
14	2015	1	0	11006.08	3997.286	2022.002	0
15	2016	0.937049	0	0	0	0	0
16	2017	0.990189	0	0	0	0	0
17	2018	0.92264	1679.633	0	0	0	0
18	2019	0.962512	609.283	0	0	0	0
19	2020	1.129502	2587.6	0	0	882594.2	0
20	2021	1.297356	7109	328930	135100	0	39432.43

Slack shows what measures should be taken to convert inefficient DMU units into efficient ones. This is achieved by more efficient management of input-output elements treated as efficiency factors. Thus, on average, in 2021 the number of employees should be reduced by 7,109, assets by 328,930, and capital by 135,100, and net profit should be increased by 39,432.43 monetary units to achieve the target efficiency of trade in Serbia. The conducted empirical research on the dynamics of trade efficiency in Serbia in the period 2008 - 2021 using the DEA model in itself indicates analytical value. Considering the importance, it is necessary to continuously analyze the dynamics of trade efficiency in Serbia based on the DEA model to improve it in the future. This greatly facilitates the selection of adequate measures in that direction. As far as we know, there are no similar studies in other countries. It is recommended that, for international comparison, they should be carried out in other countries as well. Likewise, in addition to the strategic profit model and the DEA model, multi-criteria decision-making methods are also applied

at the same time. In this way, a more complete picture of the financial performance and efficiency of trade is obtained, in the specific case of Serbia.

CONCLUSION

Based on the results of empirical research on financial performance and trade efficiency in Serbia using the strategic profit model and the DEA Super-Radila model, the following can be concluded: 1. According to the results of the Super-CCR-I model in the period 2002 - 2021 trade in Serbia was not efficient in any year. According to the results of the Super-CCR-O model Serbia's trade in the period 2002 - 2021 was not efficient in any year As a result, it was necessary to manage the analyzed input-output elements more effectively. 2. According to the obtained results of the Super-BCC-I model in the period 2002 - 2021, trade in Serbia was efficient in 2020 and 2021. In other years, it was ineffective due to poor management of the observed input-output elements. 3. According to the results of the Super-BCC-O model, Serbia's trade in the period 2002 - 2021 was efficient in 2002 and 2015. In other years, due to inadequate management of the observed input-output elements, it was ineffective. 4. Slack shows what measures should be taken to convert inefficient DMU units into efficient ones. This is achieved by more efficient management of input-output elements. Thus, on average, in 2021 the number of employees should be reduced by 7,109, assets by 328,930 and capital by 135,100, and net profit should be increased by 39,432.43 monetary units to achieve the target efficiency of trade in Serbia. Recently, the efficiency of trade in Serbia, as well as in other countries, has been affected by the Covid-19 pandemic. It has been greatly mitigated by e-commerce. Generally speaking, the efficiency of trade in Serbia has improved recently. To improve it in the future, it is necessary to manage human resources, assets, capital, sales, and profits as efficiently as possible. It is also necessary to apply new business models (multichannel sales, sales of organic products, private labels) and modern concepts of cost management (for example, activity-based costing), product categories, and customers, as well as the concept of sustainable development. The digitalization of the entire business plays a significant role in this. It is also necessary to mitigate the largely negative consequences of the energy crisis.

REZIME
PROCENA TRGOVINSKE EFIKASNOSTI U SRBIJI NA BAZI DEA SUPER -RADIJALNE METODE

Pitanje merenja i analize dinamike finansijskog položaja i trgovinske efikasnosti je kontinuirano aktuelno, značajno i složeno. Na osnovu toga, ovaj rad meri i analizira finansijske performanse i efikasnost trgovine u Srbiji korišćenjem DEA (Data Envelopment Analisis) Super-Radial modela. Prema rezultatima modela Super-CCR-I u periodu 2002 -2021. trgovina u Srbiji nije bila efikasna nijedne godine. A prema rezultatima Super-CCR-O modela, trgovina Srbije u periodu 2002-2021. nije bila takođe efikasna nijedne godine. Dakle, bilo je potrebno efikasnije upravljati analiziranim ulazno-izlaznim elementima. Prema dobijenim rezultatima Super-BCC-I modela u periodu 2002 – 2021, trgovina u Srbiji je bila efikasna u 2020. i 2021. godini. Između ostalog, ostalih godina je bila neefikasna zbog lošeg upravljanja posmatranim input – output elementima. Prema rezultatima Super-BCC-O modela, trgovina Srbije u periodu 2002 – 2021. bila je efikasna u 2002. i 2015. godini. U ostalim godinama, između ostalog, zbog neadekvatnog upravljanja posmatranim input – output elementima, bila je neefikasna. Da bi se u budućnosti unapredili finansijski rezultati i efikasnost trgovine u Srbiji, potrebno je, između ostalog, što efikasnije upravljati input – output elementima (ljudski resursi, imovina, kapital, prodaja i neto profit). Značajnu ulogu u tome igra digitalizacija celokupnog poslovanja. Isto tako, neophodno je u velikoj meri ublažiti negativne efekte energetske krize.

Ključne reči: efikasnost, faktori, DEA Super-Radijalni modeli, Srpska trgovina

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INCOME CONVERGENCE IN THE NEOCLASSICAL GROWTH MODEL: THE EXAMPLE OF THE WESTERN BALKAN STETES AND THE EUROPEAN UNION

ABSTRACT: Income convergence represents catching up of countries with different development levels, i.e., faster income growth in the less developed countries than in the developed ones in a certain period of time. The income convergence hypothesis was first introduced by Robert Solow in his neoclassical growth model, based on the assumption of diminishing returns on capital. The subject of this paper is a theoretical presentation of income convergence in the neoclassical growth model, as well as an empirical analysis of the income convergence hypothesis. The paper will present absolute and relative income convergence through graphical and theoretical analysis. In addition, the paper will present previous research on income convergence, with empirical verification of the income convergence hypothesis on the example of the Western Balkan states and the European Union. The results of the regression analysis showed the existence of income convergence in the observed countries in the period from 1995-2020.

Key words: income convergence, absolute convergence, relative convergence, neoclassical growth model, Western Balkans states, European Union

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INTRODUCTION

Robert Solow (1956) explained for the first time why income convergence occurs in his neoclassical model growth. The basic assumption of this model is the law of diminishing returns on capital, which means that lower returns on capital will first occur in the case of those countries that are rich in capital, i.e. in developed countries. At the heart of the neoclassical growth model is the claim that developed countries have a high level of productive funds per capita. If two countries with different development levels have a similar preferences system and approximately the same savings rates and investment in physical capital, the result will be slower economic growth of the developed country then the less developed one. Economic growth implies a real increase in national income per capita, which further means increase in wages, in standard of living, in accumulation, etc. (Pavlović & Čelić, 2022). In the long run, this fact, under unchanged circumstances, leads to the income convergence of countries with different levels of economic development (Cvetanović & Novaković, 2013, 2). In order to maximize the effects, and in accordance with the law of diminishing returns, capital is moved from countries where this factor is abundant to countries where there is a less abundant production factor. At the same time, the labor force is moving from countries with lower to countries with higher wages. Depending on whether countries converge towards the same or different steady states, absolute and relative income convergence can be distinguished.

The neoclassical convergence model was later critically re-examined within endogenous growth theories. The biggest difference between neoclassical and new growth theories is that the latter do not rely on diminishing returns on capital, which is the most significant argument of neoclassical growth theory on income convergence. Romer (1986) presented a “learning-by-doing” model in which economic growth rates increase with income levels, alluding to the process of divergence. In his model, Romer rejected all assumptions of the neoclassical growth model. He first rejected Solow’s basic assumption of diminishing returns on capital, arguing that the rate of return on investment and capital would rise over time, not fall, even when the country is rich in capital or its capital reserves increase (Pantić & Milojević, 2019, 100). When it comes to income convergence, Romer states that the income of countries with different development levels does not necessarily converge. On the contrary, in less developed countries, income growth may be slower or even missing. In addition, technological progress is an endogenous variable that, in the long run, grows under the influence of knowledge accumulation.

Regardless of the criticisms that followed, it can be said that income convergence represents one of the most important discoveries in the Solow's neoclassical growth model (Akinci & Yilmaz, 2012, 41). The debate about catching up with countries of different development levels, i.e. income convergence, occupies an important place in growth theories, since finding answers to this question can contribute to increasing the welfare of many countries. The subject of this paper is a theoretical presentation of income convergence (absolute and relative) in Solow's neoclassical growth model. In addition to the theoretical aspect, the paper analyzes income convergence from the empirical aspect, with a review of previous research, but also the empirical research of the author. The aim of this paper is to theoretically analyze income convergence and empirically test its existence on the example of the Western Balkan states and the European Union (EU). The rest of the paper is structured as follows. The introduction is followed by a theoretical and graphical presentation of absolute and relative income convergence. The forth part of the paper represents an overview of previous research on income convergence, followed by empirical research by the author. At the end of the paper, the basic conclusions are drawn.

ABSOLUTE CONVERGENCE

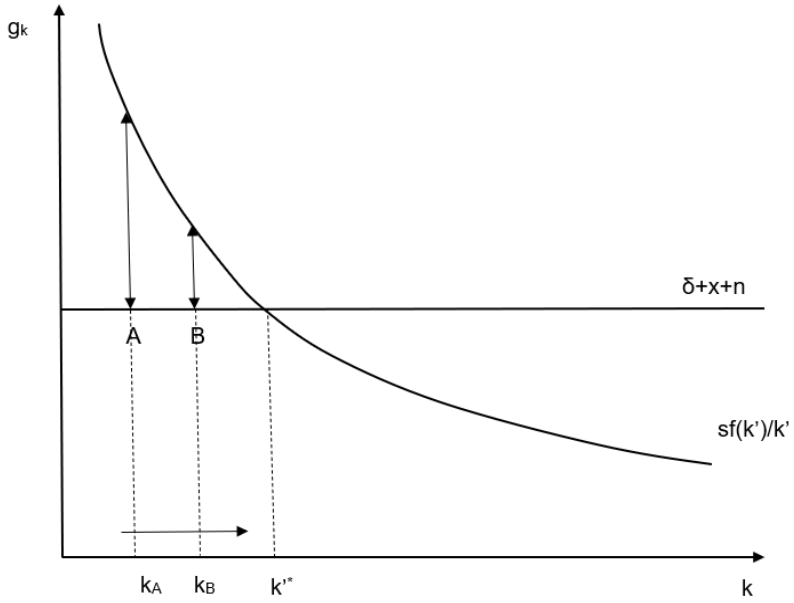
The absolute convergence hypothesis starts from the assumption that all countries have the same values of the parameters δ, x, n and s, i.e. they have access to the same technology at the rate of x, similar demographic characteristics and savings rates. Also, countries strive for the same steady state, which means that they have the same steady values of k^* and y^*, i.e. the same steady capital to labor ratio and output per capita level (Barro & Sala-i-Martin, 2004, 44). Taking these assumptions into account, the absolute convergence hypothesis states that countries with lower capital and output levels will grow faster and catch up with countries with higher capital and output levels. Graph 1 graphically shows the absolute convergence on the example of two countries A and B, where Country A is less developed (poorer) than Country B.

Graph 1 shows two countries with different levels of development. One is less developed, with a lower initial capital level k_A, while the other is developed, with a higher initial capital level k_B. The vertical difference between the savings curve $sf(k')/k'$ and the line $(\delta+x+n)$ represents the capital growth rate per employee, i.e. (Carlin & Soskice, 2006, 491):

$$g_k' = sf(k')/k' - (\delta+x+n). \quad (1)$$

One of the implications presented in Graph 1 is that less developed countries, with lower initial capital levels, have a higher growth rate. It follows that absolute convergence represents a situation in which countries or regions with lower initial capital levels per employee have higher growth rates per capita, with tendency of catching up with countries with higher capital levels per employee (developed countries) (Barro & Sala-i-Martin, 2004, 45).

Graph 1. - Absolute convergence in Solow's growth model with technological progress



Source: Carlin & Soskice, 2006, 491

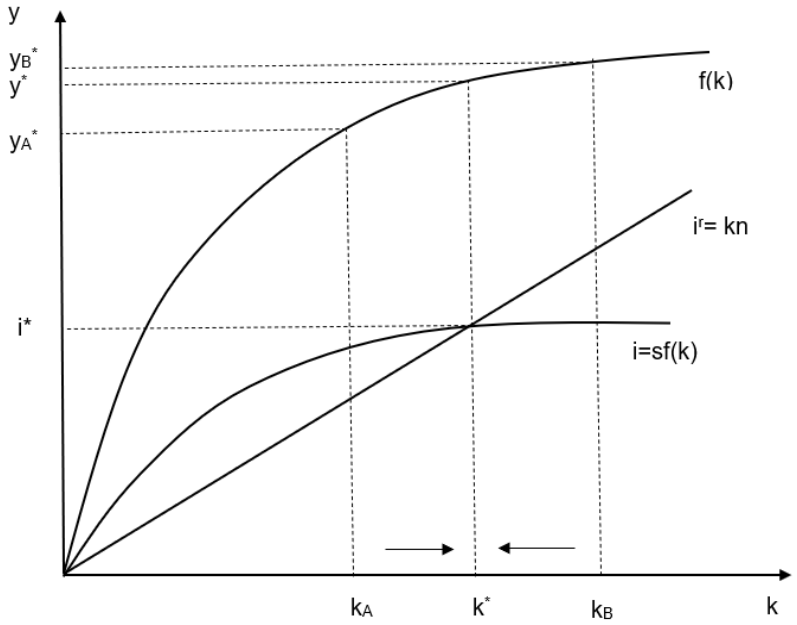
In Graph 1, it can be noticed that left of the steady state, the capital growth rate is positive and capital per employee level grows until it reaches the steady level *k**. Approaching the steady level *k**, *gk* decreases and approaches zero. The reason for this declining capital rate per employee is diminishing returns on capital (Barro & Sala-i-Martin, 2004, 45). When *k* is relatively low, the average capital product *f(k)/k* is relatively high. It is assumed that households save and invest at the same rate *s*, and therefore when *k* is relatively low gross investment per unit of capital *sf(k)/k* is relatively high. Given that capital per employee depreciates at a constant rate $\delta+x+n$, the growth rate *gk* is also relatively high.

It has already been pointed out that absolute convergence implies that all countries converge towards the same steady output per capita level, same capital to labor ratio and consumption per capita (*y**, *k**, *c**), and the same

growth rate. Absolute convergence is also shown in Graph 2, where k_A represents the capital to labor ratio of a less developed country, and k_B the capital to labor ratio of a developed country. The line $ir=kn$ represents the necessary investments per capita, in order to maintain a constant capital level. If there is no investment, the value of $k=K/L$ would automatically decrease with population growth (The Neoclassical Growth Model, 2022).

The steady state of Solow's model predicts that both less developed and developed countries will strive for the same k^*. This means that a less developed country will grow relatively fast (capital and production grow faster than the population), while a developed country will grow much more slowly (capital and production grow slower than the population). In other words as $k_A<k_B$ so is the $f(k_A)> f(k_B)$ so the marginal product of capital relative to labor is higher in less developed countries than in the developed ones. Consequently, less developed countries will accumulate more capital and grow faster than the developed ones (The Convergence Hypotheses, 2022).

Graph 2. - Absolute convegernce



Source: The Convergence Hypotheses, 2022

Germany and Japan can be taken as examples of absolute convergence. At the end of World War II the capital, but not the labor, of Japan and Germany was destroyed by Allied bombing and other war destruction. Other characteristics of the defeated countries, such as their technological capability, savings rates, and population growth rates, were comparable to the

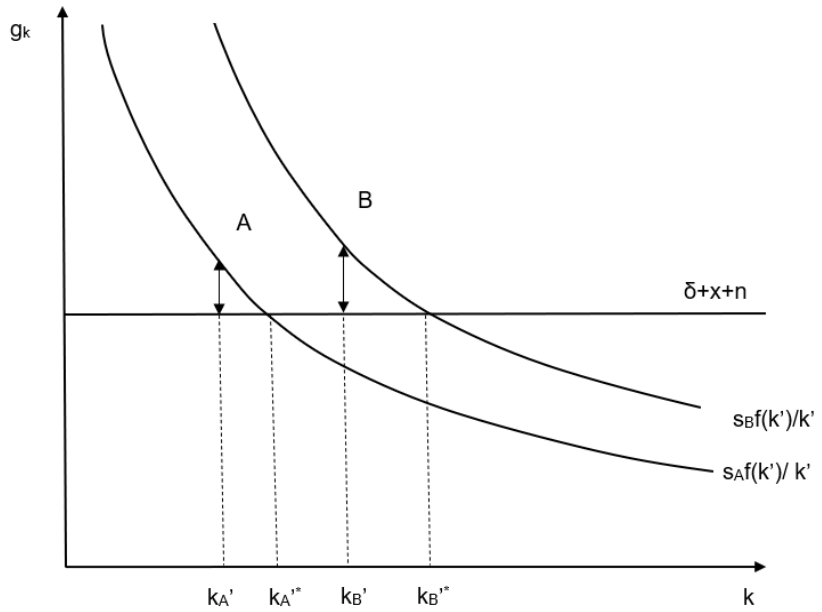
pre-war period. Moreover, they were practically the same as other countries in the industrialized world. Thus, in relation to other industrialized countries with similar parameters, post-war Germany and Japan had an extremely low capital to labor ratio, i.e. low k (similar to k_A in Graph 2). Consistent with the absolute convergence hypothesis, Solow's model would predict that these two countries would later grow faster than other developed countries in the immediate post-war period. That was exactly what happened (The Convergence Hypotheses, 2022).

RELATIVE CONVERGENCE

So far, a situation has been considered in which the observed countries have the same values of the parameters δ, x, n and s and strive to the same steady state. However, it is important to consider a situation in which two countries, with different development levels, converge towards different (own) steady states. This catching up process with countries of different development levels is called relative convergence. The steady state of each country is determined by parameters such as the savings rate, population growth rate and access to technology, with these parameters differing between countries. Less developed countries will have faster growth than the developed ones only in a situation when they are further from their steady state, compared to the distance of a developed country from its steady state (Stanišić, 2012, 165).

Graphical representation of relative convergence is showed in Graph 3. It shows two countries, a less developed and a developed one, where the less developed country has a lower savings rate than the developed one ($s_A<s_B$), as well as a lower initial capital rate per employee ($k_A<k_B$). In this case, absolute convergence does not apply. As can be seen in Graph 3, the growth rate is lower in the less developed country compared to the developed one. The neoclassical growth model predicts that each economy converges toward its steady state, and that the rate of convergence is inverse to the distance from the steady state (Barro & Sala-i-Martin, 2004, 48). In this case, the less developed country may have faster growth if it is further away from its steady state, than the developed country is from its steady state.

Graph 3. - Relative convergence in the Solow's model (different growth rates, as a consequence of different savings rates)



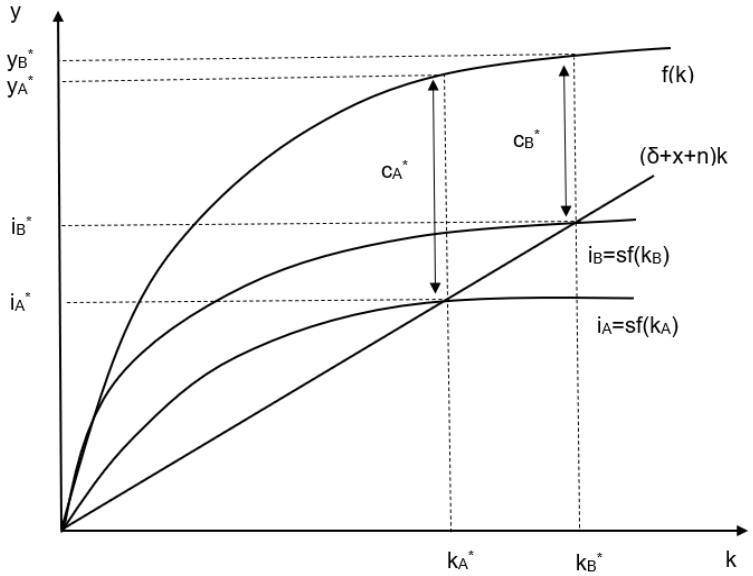
Source: Carlin & Soskice, 2006, 496

The relative convergence hypothesis also applies in the case where countries have the same technological possibilities and population growth rates, but differ in savings propensities and the initial capital to labor ratio. In this case, countries would converge towards the same growth rate, but with different capital to labor ratios. This is the result of Solow's paradox of savings (The Convergence Hypotheses, 2022). Namely, according to Solow's paradox of saving, a permanent change in the savings rate will not permanently change the growth rate of the economy. For example, an increase of the savings rate will move the investment curve upwards, and country moves from one steady state (k^*) to another (k^{**}). Prior to this change in savings, all variables grew at a population growth rate (n). Immediately after a change in the savings rate, capital (both production and consumption) grows faster than the population growth rate. But as k^* approaches k^{**}, the capital growth rate slows. When the economy reaches a new steady state (k^{**}), capital growth (both production and consumption) returns to n. A steady increase in the savings rate can only temporarily increase the growth rate. In the long run, this increase will not affect growth rates (The Solow Paradox, 2022).

Graph 4 shows the relative convergence. Two countries with different development levels may have different steady states k_A^* and k_B^*, and thus different consumption per capita, i.e. c_A^* and c_B^*. However, as long as they

have the same population growth, all their variables (capital, output, consumption) will grow at the same rate over time (The Convergence Hypotheses, 2022).

Graph 4. - Relative convergence



Source: The Convergence Hypotheses, 2022

The relative convergence hypothesis is not always valid when comparing the developed countries with the less developed ones, because the population growth rates between these countries are different. The relative convergence hypothesis is part of the explanation why countries with similar population growth rates may converge toward the same growth rate, albeit with different steady per capita income levels, capital to labor ratios, and per capita consumption (The Convergence Hypotheses, 2022).

REVIEW OF EMPIRICAL RESEARCH ON INCOME CONVERGENCE

Empirical research on income convergence emerged in the 1980s, with one of the first studies conducted by Baumol (1986). The research results showed that a homogeneous group of countries converges towards a certain growth rate, while in a heterogeneous group of countries divergence has been proven. Income convergence on the example of Western European countries has also been proven by Barro & Sala-i-Martin (1991).

After the first ones, numerous empirical studies of different authors followed, which showed the practical application of the income convergence hypothesis. A special place is occupied by research that examines the correctness of the income convergence hypothesis in the process of economic integration. Following the accession of the Central and Eastern Europe countries (CEE) to the European Union in 2004, a number of papers have emerged examining the existence of income convergence between "old" and "new" EU members (Matkowski & Próchniak, 2007; Rapacki & Próchniak, 2009; Vojinović & Oplotnik, 2008; Vojinović et al., 2009; Stanišić, 2012; Gligorić, 2014). Most of these empirical studies confirm the existence of income convergence.

Matkowski & Próchniak (2007) examined the existence of income convergence between CEE and the developed EU countries (EU15). The results showed that all CEE countries achieved faster growth than the EU15, which resulted in reduction of the income gap between these two groups of countries, i.e. the existence of income convergence. The authors proved that the acceleration of income convergence was caused by trade liberalization, increased inflows of foreign direct investment and coordination policy. Rapacki & Próchniak (2009) tested the income convergence hypothesis between the 27 former socialist countries. The results showed the existence of β-convergence, but not σ-convergence, proving that it is most pronounced in CEE countries.

The existence of income convergence within the CEE group was examined by Vojinović & Oplotnik (2008) and Vojinović et al. (2009). Research results by these two groups of authors showed that poorer CEE countries grew faster than richer CEEs. As a result, the income gap between these two groups of countries has narrowed, but remains quite large.

Stanišić (2012) examined the existence of income convergence between the 25 EU countries in the period 1993-2010 and proved the existence of income convergence. The results also showed the impact of the Global Economic Crisis on income convergence, leading to inverse results when it comes to income convergence in the group of CEE and EU15 countries. Since the beginning of the Global Economic Crisis in 2007, there has been divergence in the first group of countries, while the second group of countries showed income convergence.

The existence of income convergence between "old" and "new" EU members was also examined by Gligoric (2014). Research results showed convergence between these two groups of countries, which started significantly before the "new" members joined the EU. The author concluded that the process of pre-accession harmonization, with the implementation of major economic reforms, primarily leads to rapid integration and rapid growth towards a developed Europe.

In addition to a large number of papers examining the income convergence hypothesis between the "old" and "new" EU members, there have been papers examining the correctness of this hypothesis between the Western Balkan states and the EU (Murgasova et al., 2015; Stanišić, 2016). However, there is still not enough research to answer the question of whether the Western Balkan states are catching up with the EU.

Murgasova et al. (2015) tested the difference in the rate of income convergence between the Western Balkan states and the "new" EU members, on the one hand, and the EU15, on the other. The results obtained by the authors confirm the existence of income convergence between the "new" EU members and the EU15, but weak income convergence between the countries of the Western Balkans and the EU15. These results refer to the period before the outbreak of the Global Economic Crisis. Observing the period after the Global Economic Crisis, the authors proved that income convergence exists for the Western Balkan states, but was slower than that achieved by the "new" EU members. As possible reasons for such results, the authors cited the dominance of the public sector in the Western Balkans, better quality governance and revised market-oriented institutions, as well as a stronger human base and a developed financial system in the "new" EU member states. Also, as one of the possible reasons, the authors state a closer geographical position in relation to the EU15 of most "new" EU member states, comparing to the Western Balkan states. Geographical proximity allows them easier access to the market, investments and knowledge transfer.

Stanišić (2016) also tested the existence and speed of income convergence of the Western Balkan states and the EU15, compared to the "new" EU member states. The author concluded that there is an income convergence between the Western Balkan states and the EU15. However, the results also show that this income convergence was interrupted by the outbreak of the Global Economic Crisis, which led to an increase in the income gap between the Western Balkan states and the "new" EU member states.

EMPIRICAL ANALYSIS OF THE INCOME CONVERGENCE HYPOTHESIS

Barro & Sala-i-Martin (1991) introduced the equation for testing the existence of β-convergence, which was later used by numerous authors such as Matkowski & Próchniak, 2007; Rapacki & Próchniak, 2009; Vojinović & Oplotnik, 2008; Vojinović et al., 2009. The equation has the following form:

$$1/T \log (y_{i,T} / y_{i,0}) = \alpha_0 + \alpha_1 \log y_{i,0} + e_i, \quad (2)$$

where: T - length of the observed period, $y_{i,T}$ - gross domestic product (GDP) per capita in current prices in the last year of the observed period, $y_{i,0}$ - GDP per capita in current prices in the first years of observed period, α_0 - constant, e_i - standard error. A negative value of the coefficient α_1 indicates the existence of income convergence.

In a later study by the International Monetary Fund, an equation was introduced that, in addition to its existence, also compared the speed of convergence among "new" EU member states and the Western Balkan states (Murgasova et al., 2015). Stanišić (2016) used the same equation in his analysis. The mentioned equation has the following form:

$$GRGDP_{i,t} = \beta_0 + \beta_1 DIST_{i,t-1} + \beta_2 DIST_{i,t-1} \times WBS + \beta_3 WBS + u_{i,t}, \quad (3)$$

where $GRGDP_{i,t}$ represents GDP per capita growth rate in current prices of the country *i* in year *t*, *t* stands for the observed time period, and $DIST_{i,t-1}$ represents a gap in GDP per capita between the country and the EU15 average in the previous period. WBS is an artificial variable that takes the value 1 if the country belongs to the Western Balkan states, and 0 if it belongs to the "new" EU member states. β_0 is constant, and $u_{i,t}$ is standard error.

A positive value of the β_1 coefficient shows that there is income convergence between the Western Balkan states and "new" EU member states, on the one hand, and the EU15, on the other. A higher value of this coefficient means faster convergence. The β_2 coefficient measures the interaction of belonging to the Western Balkan states and the income gap. A positive value of this coefficient means that the rate of income convergence of the Western Balkan states is higher than the rate of income convergence of "new" EU member states. A negative value of this coefficient means a lower rate of income convergence of the Western Balkan states than the rate of income convergence of "new" EU member states. The coefficient β_3 shows the extent to which the growth rates of the Western Balkan states differ from "new" EU member states. Positive value of this coefficient shows that, with the same initial income gap with the EU15, the countries in the Western Balkan states group achieved higher growth rates compared to the countries in the "new" EU member states group, which means faster income convergence. The reverse is for the negative value of this coefficient.

The paper starts from the assumption that the Western Balkan states are catching up with the income level of EU countries, i.e. that there is income convergence between these two groups of countries. In order to test this assumption, the equation introduced by Barro & Sala-i-Martin (1991) will be used (equation 2), where the observed period is from 1995 to 2020. This equation will be used in the paper because it only tests the existence of

income convergence, not the difference in the speed of income convergence among the observed countries.

Table 1. - Results of regression analysis of income convergence

	Coefficient	***p***
Constant	0,06	0,03
$logy_i$	-0,004	0,05
R^2	0,12	

Source: author's calculation

$logy_i$ - logarithm of GDP per capita in the initial year of observation

The results of the income convergence analysis are shown in Table 1, where it can be seen that the coefficient with the independent variable is negative and amounts to -0.004. This means that the assumption of the existence of income convergence is confirmed. The results of the regression analysis indicate that income convergence between the Western Balkan states and the EU exists. In other words, the countries of the Western Balkan region are catching up with the income of EU member states.

CONCLUSION

One of the more important questions that growth theories deal with is whether poor countries will catch up with rich ones, that is whether the income of poor countries will converge towards the income of the rich ones. Robert Solow started a debate on catching up with countries of different development levels, i.e. the issue of income convergence. The income convergence hypothesis is based on the law of diminishing marginal returns on capital. This means that lower returns on capital will first occur in the case of those countries that are rich in capital, i.e. in developed countries. At that time, this debate caused great controversy and was rejected. Namely, the proponents of endogenous growth theories rejected Solow's assumptions, i.e. diminishing returns on capital and exogenous technological progress, due to which convergence does not necessarily occur, on the contrary, divergence may occur. Regardless of the criticism made, it can be said that the income convergence hypothesis represents one of the most significant discoveries in Robert Solow's growth model. Today, there is a large number of empirical studies whose results support this hypothesis and confirm the existence of income convergence. In this paper, income convergence is analyzed both from the theoretical and the empirical aspects. A regression analysis was performed with the aim of testing the assumption of the existence of income

convergence between the Western Balkan states and the European Union in the period 1995-2020. This assumption has been confirmed, which means that the Western Balkan states are catching up with the income level of the European Union member states. In addition to the theoretical and graphical presentation of income convergence, the scientific contribution of the paper is an empirical analysis that contributes to the enrichment of the literature in this field. As a possible direction of future research, larger number of years to be analyzed can be mentioned, as well as the division of the entire period into subperiods, in order to analyze the impact of the transition process and the Global Economic Crisis on income convergence.

REZIME
DOHODOVNA KONVERGENCIJA U NEOKLASIČNOM MODELU RASTA: PRIMER ZEMALJA ZAPADNOG BALKANA I EVROPSKE UNIJE

Dohodovna konvergencija predstavlja sustizanje zemalja različitog nivoa razvijenosti, odnosno brži rast dohotka nerazvijene u odnosu na razvijnu zemlju u određenom vremenskom preiodu. Toremu o konvegenciji dohodaka prvi je predstavio Robert Solow u svom neoklasičnom modelu rasta, bazirajući je na pretpostavci o opadajućim prinosima na kapital. Predmet ovog rada je teorijski prikaz dohodovne konvergencije u neoklasičnom modelu rasta Robert Solow-a, kao i empirijska analiza hipiteze o dohodovnoj konvergenciji. U radu će, grafičkim putem i teorijskom analizom, biti prikazane apsolutna i relativna konvergencija dohodaka. Osim toga, u radu će biti prikazana dosadašnja istraživanja o dohodovnoj konvergenciji, uz empirisjku proveru ispravnosti hipoteze o dohodovnoj konvergenciji na primeru zemalja Zapadnog Balkana i Evropske unije. Rezultati regresione analize su pokazali postojanje dohodovne konvergencije na primeru posmatranih zemalja u periodu 1995-2020. godine.

Ključne reči: dohodovna konvergencija, apsolutna konvergencija, relativna konvergencija, neoklasični model rasta, zemlje Zapdanog Balkana, Evropska unija

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QUALITY 4.0 AND HR PRACTICES AT LIGHTHOUSES OF DIGITAL TRANSFORMATION

ABSTRACT: Quality 4.0 is a fascinating subject that interests both theoreticians and practitioners alike. As technology continues to advance, this topic is only going to become more distinguishing. This paper elucidates the concept of Quality 4.0, its advantages, and the crucial factors required for its implementation in companies. Importantly, it highlights the significance of having a competent workforce. The paper analyzes the human resource management practices that affect Quality 4.0 and identifies the most effective ones by studying companies that have succeeded in the process of digital transformation. By comparing the usage cases of 9 "Lighthouses Network" companies of digital transformation in quality management and the HR practices they apply, the paper

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identifies the ways of working and human resource management practices that lead to the effectiveness of Quality 4.0.

Key Words: Quality 4.0, HR practices, digital transformation, lighthouses of digital transformation

INTRODUCTION

Quality 4.0 is a term used to describe quality management in accordance with the current stage of information technology development. Its essential features include improvement through prescriptive analytics and artificial intelligence, end-to-end integration, real-time process monitoring, big data management, and continuous data collection. Companies that are successful in the process of digital transformation pay special attention to processes, change management, and human resource management. As an example, we can cite companies (or their individual factories in different locations) that form a network of digital transformation lighthouses whose digital transformation practices lead to increased productivity, sustainability, and resilience of companies. The Lighthouses Network (recognized by the World Economic Forum and composed of 132 cites selected by an independent expert committee based on their successes in digital transformation) is a network of leaders of the fourth industrial revolution. The latest report from 2023 says that most non-lighthouse companies state that the main barriers to digital transformation are a lack of commitment from management and investors, while lighthouses define a lack of strategy as the main obstacle. Lighthouses say the best enablers of digital transformation are an engaged workforce and digital transformation offices (World Economic Forum, 2023).

LITERATURE REVIEW

Quality management in the context of digital transformation requires a complete overhaul of all company processes. Quality 4.0 is defined differently by various authors (Sader, S., et.al.,2021), but they all share the notion that it involves the use of Industry 4.0 technologies to transform the quality management process in order to achieve excellence with no boundaries. Industry 4.0 technologies that enable Quality 4.0 include Machine Learning, the Internet of Things, Artificial Intelligence, Cloud technologies, Big Data, and others. These technologies can be combined to create new solutions for a higher level of excellence in products, processes,

and complete systems, such as smart factories and cities. The Digital Twin has already achieved this level of excellence, leading to the development of the Metaverse. As a result, there is now a wide variety of usage cases for these technologies in improving process quality, including HR Gamification and People Analytics.

The following benefits of applying Quality 4.0 for companies could be found in the literature: more efficient and effective, predictive and prescriptive data analysis in real-time; visual control; automated quality checks; waste reduction; synergy with Lean tools (Antony,J., et.al., 2021), a new experience for customers that is characterized by a higher degree of satisfaction, based on improved product quality as well as excellence in inventory management (Küpper, D., et.al., 2019), ensures the efficiency of research and development (Javaid, M., 2021), improves the operational and environmental, financial and social performance of the company (Antony, J., et.al., 2021).

Quality 4.0 is essentially the digitization of the quality management process. Thus, the critical factors for digital transformation apply to Quality 4.0 as well. These factors include having clear transformation goals and integrating strategies, top management's unwavering commitment to digital transformation, securing and deploying skilled talent, following agile work methodologies, using efficient progress monitoring systems, and utilizing modular technologies and data platforms (Boston Consulting Group, 2021). According to the BCG study (2021), the lack of digital skills among employees is the primary obstacle to starting the digital transformation process. However, besides skills, it is equally important to manage employees effectively and implement HR practices that facilitate a smooth and efficient transformation within the company.

METODOLOGY

The main research method in the paper is a comparative analysis of digital transformation usage cases and a comparative analysis of human resource management practices, on the example of companies that succeeded in the transformation process. The sample size is 9 companies, which is more than 10% of the companies that make up The Lighthouses Network, which actually counts organizational units of the company in different locations where the usage case is. It happens that one company has several locations that are included in the network (e.g., Unilever has 5, Schneider Electric 7, etc.) so the number of companies that make up The Lighthouses Network is no more than 80. As a result, the conclusion based on this sample size is

reliable. In the data analysis, SPSS was used to determine the correlation between the variables.

ANALYSIS AND DISCUSSION

As mentioned above, the subject of the analysis is the data obtained from the report on digital transformation in companies that are pioneers of the transformation, which were provided by the World Economic Forum and the companies themselves. Thus, Table 1. shows the usage cases of digital transformation in quality in 9 companies and their effects.

Table 1. Digital transformation in quality and its effects

COMPANY	USAGE CASES OF DIGITAL TRANSFORMATION IN QUALITY	EFECTS
PETRONAS	The company has implemented a solution for ensuring the safety of the shop floor based on artificial intelligence (AI Incident Risk Analytics). The Center for Digital Twins of Molecular Transparency Processes in the entire value chain has been created, which brings together all digital twin solutions in the company. The cloud for a unified data warehouse for the entire business (Petronas, 2022).	Scalability and flexibility, better data security, improved maintenance, product, process, and system planning, improved decision-making, risk mitigation, and the exploration of innovative approaches.
NOVO NORDISK	The Company Invested in digitization, automation, and advanced analytics in manufacturing through IoT, optimizing production with advanced analytics and digital applications that enable digital planning and automation OEE data collection, and digital performance management (World Economic Forum, 2020).	Increased productivity of production, quick resolution of problems, reduction of downtime, and increased efficiency of the equipment.
UNILEVER	Using artificial intelligence to manage security, a real-time data acquisition platform as an end-to-end solution for the entire supply chain (World Economic Forum,2020). Implementing AI across the entire value chain (World Economic Forum, 2023) and digital twins for agility in innovation (World Economic Forum, 2022)	Increased OEE, reduced security risk, reduced inventory levels, and improved lead times. Guaranteed reduction in product development time and all production costs, increase in productivity, and reduction in product defects.

HENKEL	This company carries out digitization by turning products into platforms and platforms into services (World Economic Forum,2020). Digitization of the supply chain, IoT sensors that collect data on the cloud, enable predictive analysis, diagnostics and optimization (Henkel, 2023). Digital twins of factories (World Economic Forum, 2020) Implemented "connected worker" platform as an application, where employees can share data, instructions, real-time dashboards.	Better utilization of production capacities, better material flow, reduced ecological footprint., improved employee safety, greater efficiency of the production line.
FORD OTOSAN	The company has implemented an internal digital application to connect production workers, digital processes, and systems. It enables operator coordination with the operation, real-time data, data performance monitoring, and zero error (Ford Otosan, 2021). An application for integrating logistics processes with digital systems and people. Predictive data analysis based on IoT and product data on a connected platform. Agile transformation strategy based on organizational culture, leadership transformation, employee experience, and work practices (Ford Otosan, 2021).	Increasing efficiency and quality in production, quality and logistics efficiency with zero supplies.
ARÇELIK	The company has implemented a digital twin for energy management and water purification (World Economic Forum, 2023). with over 200 automation installed at various production locations, along with digital quality transformation. Additionally, a digital twin of the product was created. They have implemented RPA in 57 business-critical processes. To further support their technological advancements, they have established a Center for Information Technology, Data, and AI R&D Centers, and have won 29 development programs, with investments in research and development increasing by 115% compared to the previous year	Reduced energy and water consumption, increased water recycling. Positive effects are noticed also in improved efficiency, productivity, and data quality. Through RPA, process optimization was achieved, expressed in labor force savings (44 employees) (Arçelik, 2022).

	(Arçelik Annual Report, 2022).	
SCHNEIDER ELECTRIC	The company leverages IoT, AI, and prescriptive analytics to improve quality through end-to-end solutions, AI-powered quality inspection, and digital manufacturing performance management (World Economic Forum, 2022). It also employs connected IoT- for descriptive analytics to connect employees. Additionally, the company has implemented digital energy management to optimize energy consumption (World Economic Forum, 2020).	The transformation implemented in this company has led to several positive outcomes. These include a reduction in defects, shorter waiting times for product delivery, increased production and procurement efficiency, higher accuracy in demand forecasting, improved OEE and customer satisfaction, and a reduction in CO2 emissions.
FLEX	This company has implemented digital transformation through e-waste recycling along the entire supply chain through IoT, digital performance management, AI-based security management, and implementation of digital workforce connectivity tools (World Economic Forum, 2023).	Digital transformation actions in this company have achieved the following: cost reduction, customer satisfaction, employee well-being, and increases in OEE.
CEAT	Digital transformation is achieved here through e-waste recycling along the entire supply chain via IoT, digital performance management, AI-based security management, and digital tools for workforce connectivity (World Economic Forum, 2023).	After implementing process improvements, "the site reduced cycle times by 20%, process scrap by 46%, and energy consumption by 15%, resulting in 2.5 times increase in export and OEM sales in two years" (World Economic Forum, 2023).

Source: Authors according to data from World Economic Forum Global Lighthouse Network and the annual reports of the companies

After analyzing the digital transformation practices adopted by the companies mentioned in the example, we have arrived at the following conclusions:

1. To achieve digital transformation, companies need to effectively implement technologies like IoT, AI, Digital Twin, and RPA. These technologies can be used to create solutions that improve individual processes and end-to-end integration.

2. Adopting these technologies also implies changes in the way companies organize and work. This includes applying agile methods,

establishing centers for digital transformation, and investing in research and development.

3. The benefits of digital transformation can be observed in the form of cost savings and improvements in the operational and financial performance of the companies that have undergone this transformation.

As digital transformation causes radical changes throughout the organization, effective change management is of particular importance. These changes also require the full involvement of all resources, primarily employees, in the entire process of digital transformation. That involvement is achieved through adequate incidental power management practices. Therefore, it is reasonable to find out how companies that achieve success in digital transformation manage these resources. The answer to this question in this paper was given through the systematization of HRM practice in companies that were the subject of comparison in the implemented solutions and the effects of digital transformation in improving the quality of the process. The data was obtained from the annual reports of this companies, and part of it was from their platforms available to the public, such as social networks, websites, podcasts, etc. Table 2. shows human resource management practices in these companies whose factories (one or more of them) represent lighthouses of digital transformation.

Table 2. HRM practices of digital transformation lighthouses

COMPANY	HRM PRACTICES
Petronas Malaysia	This company has a workforce strategy that is agile, inclusive, and self-sustaining. They invest in the development of their employees through initiatives such as the Digital Academy and Citizen Analytics. These programs have created 150 machine-learning modules and 850 dashboards. Additionally, they have an internal platform that promotes self-learning, career development, and transparency among employees, giving everyone equal opportunities. The company also runs the Code Without Barriers program, in partnership with Microsoft, which aims to train women in data and AI skills. So far, 400 women have received training through this initiative. To create a better working environment and drive innovation, the company collaborates with stakeholders like Amazon Web Services (AWS). They share knowledge and experience and work together to ensure talent development. Social responsibility is embodied in raising students' digital skills through the BeDigital Bootcamp. Acceleration strategy and sharing of knowledge between business and universities (cooperation with 20 universities in the country and 10 abroad on research and talent development) occupy an important place in talent recruitment

	practices. Investment in research capacity (195 research laboratories) are very intensive at this company. Also, a platform for continuous improvement that encourages employees to undertake both individual and joint activities and programs of Continuous Improvement, Agile, and Innovation (created digital platforms for all three activities, as well as various certifications of employees who use these platforms) are excellent HRM practices. All these practices have led to talent retention of up to 94%. The relationship of heirs to inheritance is 2:1. (World Economic Forum, 2022).
Novo Nordisk Denmark	This company has developed a strategy of creating a sense of purpose to ensure greater employee satisfaction. (Novo Nordisk, 2023) Due to the nature of the job, employee training is mandatory for all employees, especially in the field of ethics, where 99% of employees have received training. The strategy of research and development and strengthening the capacity of employees through training. Thus, the number of employees in research and development in 2022 increased by 44% compared to 2021, the number of Ph.D. students increased by 50%, and Post Doc fellows increased by 65% (Novo Nordisk, p.105, 2023).
Unilever	"They utilize cloud-based HR systems to centralize employee data, automate administrative tasks, and enable self-service functionalities for employees" (Bir Kaur, S., et.al.,2023). For recruitment and candidate selection processes, they use gamification and video interviews based on artificial intelligence. "In the process of performance appraisal, supported by NLP, Unilever is able to decode certain tacit traits and behavior modes of successful and competent leaders in the existing workforce through machine learning according to the text data from performance appraisal statement" (Hu, Q., 2023). The strategy of training employees for digital skills, which in 2022 resulted in 15% of employees being trained in digital skills. There are mental health programs to improve employee well-being. They base their work strategy on three principles: a more agile approach through the establishment of a center for agile excellence, decentralization of decisions and management autonomy, and raising the domain expertise of employees. (Unilever, 2022).
Henkel	Apart from individual career planning (Henkel, p.134, 2022), they also have Leadership Commitments, Digital Upskilling, and Global Learning Hub, projects for women in AI, thus creating a digital culture. Work in the company is based on flexible working hours and agile processes. Cooperation with universities and a student internship program in the company, with the possibility of mentoring. They also have a Platform for e-learning, Henkel eCademy. (Henkel, 2022)

Ford Otosan Turkiye	In this company, there is a reverse mentoring program where leadership is replaced by "leadership that learns", it encourages the effective exchange of knowledge between junior and senior managers. In addition to this, there are special programs designed to empower and exchange the knowledge and experience of women engineers and women leaders of working groups in the field. The company fosters an agile way of working adopted by 23% of employees and 600 teams. In order to retain existing and attract new talents, cooperation with universities was developed, organizing events to attract individual plans for the development of leadership skills talents. 33 employees completed digital skills development programs in 2022, programs for data analysts and 34 for data scientists. The goal for the next year is 700 employees in the field of data management. The policy of internal mobility through agile development instead of static policies, using an internal platform that signals to employees open positions with full or part-time engagement. They also have an in-house AI-based talent development platform that matches mentors with program participants based on their career development needs (Ford Otosan, 2021). The talents and their knowledge, skills, and experience are visible throughout the organization in this way. This eliminates discrimination in promotions.
Arçelik Turkiye	This company conducts training and development programs for employees to enhance their digital skills through the Digital Academy. Additionally, digital literacy training is also provided for production workers. Functional competencies are strengthened through academies and technical training, while soft skills are honed through competency programs. The company has adopted an agile way of working across the entire organization and provides training in agile techniques through Agile Academy programs. A program for analytical skills has also been developed in collaboration with universities to bridge the gap between business and technical competencies. Furthermore, the company has a succession strategy in place for all management positions. For workforce planning, they have an AI model that predicts future employee skill requirements, jobs, and necessary training. This company specializes in training and development programs for employees to enhance their digital skills through the Digital Academy. Additionally, digital literacy training is also provided for production workers. Functional competencies are strengthened through academies and technical training, while soft skills are honed through competency programs (Arçelik, 2022).
Schneider Electric	When it comes to training practices in this company according to training areas, sustainability, IT and technical skills dominate, the areas of employee well-being and agility are the least represented (Schneider Electric, p.287, 2022). This company implements employee training programs in cyber security and ethics. To effectively implement the talent management strategy, they use a digital tool for talent acquisition, which increases the number of

	channels and provides an effective digital experience, which increases the number of talents (100%) in the company and less application time (95%) (Schneider Electric, 2021). Digital training program intended for 75,000 employees, with a completion rate of 50% in 2022. That program is implemented by assessing current digital skills in 6 critical skills areas, linking individual assessment results to tailored content, a digital skills dashboard to better monitor performance and take action based on results (Schneider Electric, p. 216, 2022). This program includes a master's program for digital experts who do 1:1 coaching in business projects and a digital domain certification program. There is also a current talent rotation program for digital training, where talent from commercial and supply chains can spend a year with the software research and development team (Schneider Electric, p.218, 2022). An AI-based platform for internal recruitment and career development. The purpose of the platform is to connect talents from the global network with mentors, to enable talents to access special training programs and specially created jobs and positions. In order to apply to the platform, there are conditions that talents must fulfill (Schneider Electric, p.218, 2022).
Flex	The human resource management practices that characterize this company are focused on the development and training of employees in order to increase engagement, productivity, and talent retention. Thus, they have developed an internal platform for learning and connecting with mentors based on AI, predictive and prescriptive analytics, and recommendations on which skill set best suits the employee's defined career path. In addition to this, they also have mental and emotional health programs that are implemented for all employees (through the platform, each employee is provided with up to 8 sessions in the form of therapy for the preservation of mental health, on an annual basis (Flex, 2022). They also show concern for their employees through the employee scholarship program for acquiring skills, and knowledge through certificates or schooling at universities. They have special women's empowerment programs. Talents are also reached through cooperation with universities and professional associations in order to make it easier to find talent (Flex, 2022).
CEAT	This company uses (Chief Listening Coaching Officer) an AI-based application that provides real-time information to employees about culture and policies. Employee training and development programs encompass a variety of initiatives such as the Financial Academy and Technical Academy. It is worth noting that 48% of employees were trained in technical skills using a combined learning approach. Additionally, the Academy of Research and Development provided training to 17% of employees, while the Digital Skills Academy held 80 workshops for digital transformation, 40 for analytics and data engineering, and 5 for data scientists (Ceat, 2023). What characterizes HRM in this company is the high automation of the HR process RPA (90%) (Ceat, 2021).

Source: Authors according to data from the annual reports of the companies

After analyzing the HRM practices of the companies listed in the previous table, the following observations can be made:

1. The HRM function is mostly digitized, as evident from the use of AI, training with disruptive technologies, predictive analysis for workforce planning, and employee connectivity tools.
2. There is an agile way of working in the company, and employees are provided with relevant training and courses related to agile methodologies.
3. There is an extensive network of cooperation that helps the company position itself in the talent market.
4. Employees are extensively trained in digital skills.
5. There are diverse programs for reskilling and upskilling employees,

Table 3. Workforce trends in terms of employees, training and digital skills

Company	Number of employees		Employee Attrition Rate (%)		Average total hours of training per employee		% of employees who obtained digital skills training
	2021	2022	2021	2022	2021	2022	2022
Petronas	46884	49771	8.4	6.6	30	39	63
Novo Nordisk	48478	55185	11	8	*	*	99
Unilever	148044	127416	13	22	*	*	15
Henkel	52700	51950	*	*	*	*	23
Ford Otosan	13724	15560	9.3	*	62	87	9
Arcelik	40934	41030	*	*	*	29	7
Schneider Electric	166025	162339	18.1	16.6	24.5	24.1	23
Flex	167504	160000	*	*	*	35	*
Ceat	7622	8207	*	19	*	*	2

Note: The data obtained from the companies' annual reports are not uniform in terms of the displayed items, which is a reason why data is missing in some variables. *
Note: Data obtained when the total number of digitally trained and employed people shown on page 215 is divided by the total number of employees shown on page 474 of Schneider Electric Annual report (2022).

Source: Authors according to data from the annual reports of the companies

Based on the data from the previous table, those companies with the higher percentage of people trained in digital skills have less employee attrition. This assumption can be tested by determining the correlations between these two variables.

Table 4. Correlation between employee attrition and digital skills training

Correlations

		Employee Attrition Rate (%)	% of employees who obtained digital skills training
Employee Attrition Rate (%)	Pearson Correlation	1	-.883*
	Sig. (2-tailed)		.047
	N	5	5
% of employees who obtained digital skills training	Pearson Correlation	-.883*	1
	Sig. (2-tailed)	.047	
	N	5	8

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Author

The Pearson correlation coefficient at the level of statistical significance shows an inverse relationship between employee attrition and digital skills training, the more digital skills training, the lower the employee attrition rate. This is not surprising because studies show a positive impact of employee training on employee retention. (Aktar, S., 2023). Employee retention has a positive effect on company performance (Bhakuni, S., & Saxena, S., 2023). Among HRM practices, the most important for employee retention are training and career development practices. Because the costs arising from the company's inability to retain employees are much higher than the costs of recruiting and introducing a new employee. They also refer to changing teams and organizational knowledge. A high rate of departure or resignation in an organization negatively affects its image in the labor market, which reduces its talent acquisition power. One of the most important benefits for employees is training (Zweig, B., 2023). which puts digital skills in the foreground in conditions of digitization. Digital skills training enables retraining and retraining of existing employees, reducing their anxiety at work and skepticism (Siemon, D., & Kedziora, D., 2023). There are numerous examples of successful employee retraining through various development and training programs for digital skills (Walsh, K., 2022). This has a positive impact on the company by increasing employee satisfaction, engagement, and reducing operational costs. It also results in increased customer satisfaction and a positive company image. However, market demands and disruptive technologies require not only new knowledge and skills but also the emergence of new professions. These include data scientists, data engineers, RPA programmers, cybersecurity specialists, digital twin engineers, and AI and ML engineers.

CONCLUSION

The digital transformation of the company results in a new business operating model, digital technology is only an enabler. However, the main challenge is how to come up with workable ideas, how to manage changes, and the speed of implementation. Lighthouses of digital transformation use change management and digital academies for this, developed standards in communication and feedback, and an agile approach to work. Employees should be trained and connected to all these approaches. And that's the moment when the employee connection platform comes to the fore.

Having a standardized system for all documents and making instructions available to employees in digital form is crucial, especially for production processes. This allows for continuous improvement by providing feedback. Quality 4.0 ensures high-quality standards and regulatory compliance by connecting all IoT devices and systems to detect any defects. The system sends the relevant data to the responsible personnel for problem-solving and provides real-time feedback to the operators on what actions to take. Quality 4.0 also uses machine learning algorithms to predict quality outcomes. This approach promotes cooperation between employees in real-time locally and globally, with the goal of solving problems simultaneously. Employee training is facilitated by digitizing knowledge within the platform, which is accessible in real time using mobile phones, tablets, etc. Supervisors can monitor employees' knowledge and knowledge gaps. Additionally, Quality 4.0 provides continuous improvement measurement through dashboards for process performance indicators, which can be used for further analysis. Therefore, the role of Quality 4.0 and human resource management practices in the digital transformation of companies is of utmost importance.

REZIME

KVALITET 4.0 I PRAKSE UPRAVLJANJA LJUDSKIM RESURSIMA KOD SVETIONIKA DIGITALNE TRANSFORMACIJE

Kvalitet 4.0 je zapravo digitalna transformacija upravljanja kvalitetom. Podrazumeva primenu tehnologija Industrije 4.0 i transformaciju procesa rada. Da bi digitalna transformacija rezultirala u uspešnoj primeni, svetionici digitalne transformacije (prema Svetskom ekonomskom formu), tj. preduzeća koja su na jednoj ili više svojih lokacija i organizacionih jedinica uspešno implementirala digitalnu transformaciju se slažu da su osnovni preduslovi efikasno upravljanje promenama, agilnost u radu i obuka zaposlenih ne samo u digitalnim veštinama već i u primeni agilne metodologije. Ova preduzeća to postižu preko akademija ili posebnih

programa za digitalne i soft veštine i agilne metode rada. Komparativna analiza je pokazala da svetionici digitalne transformacije imaju kreirana rešenja za optimizaciju, automatizaciju i end-to-end integraciju procesa, koja su bazirana na primeni disruptivnih tehnologija poput IoT, AI, ML, Big data, Digital Twin i RPA. Usvajanje ovih tehnologija podrazumeva i promene u načinu organizovanja i rada kompanija. To uključuje primenu agilnih metoda, uspostavljanje centara za digitalnu transformaciju i ulaganje u istraživanje i razvoj. Značajni benefiti od implementacije digitalne transformacije se ogledaju u uštedama troškova i poboljšanju operativnih i finansijskih performansi. Kada j reč o praksama upravljanja ljudskim resursima kompanije koje imaju svoje svetionike digitalne transformacije odlikuje digitalizacija procesa upravljanja ljudskim resursima. Digitalizacija je vidljiva kroz upotrebu veštačke inteligencije, kroz alate obuke, prediktivne analize za planiranje radne snage i alate za povezivanje zaposlenih. Njihovu organizacionu kulturu karakteriše agilnost. Svetionici digitalne transformacije imaju jako široke mreže saradnje sa institutima, univerzitetima, profesionalnim udruženjima. Benefiti te saradnje se ogledaju u inovacijama proizvoda i procesa, akviziciji talenata i pozitivnom imidžu kompanije na tržištu, kao mestu poželjnom za rad. Prakse obuka u ovim kompanijama uključuju dokvalifikacije i prekvalifikacije zaposlenih u skaladu sa definisanim strategijama. Korelacionom unalizom varijabli napuštanja organizacije i prosečnog broja zaposlenih obučenih za digitalne veštine došlo se je do zaključka da zaposleni napuštaju preduzeća ako ove obuke nedostaju.

Ključne reči: Kvalitet 4.0, prakse upravljanja ljudskim resursima, digitalna transformacija, svetionici digitalne transformacije

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SUCCESSFUL COMMUNICATIONS AS AN ELEMENT OF EFFECTIVE MANAGEMENT OF EMERGENCY SITUATIONS

ABSTRACT: Although they are an integral part of human history, natural disasters have become more frequent and more devastating. The devastating effects of natural disasters, as well as technical-technological accidents and other social conflicts, lead to emergency situations. An emergency situation is defined as a situation when the risks and threats or consequences of disasters and other events are of such scope and intensity that their occurrence or consequences cannot be prevented or eliminated by the regular action of competent services and authorities. Communication is important for the successful management of an emergency situation. It is necessary to use all available communication channels so that key messages reach the public as quickly and efficiently as possible. The use of new technologies

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and media is becoming an indispensable means of communication in emergency situations. The role of state bodies, institutions and the media are to provide timely information about the necessary measures that need to be taken, as well as the transmission of key messages to the public. For the communication process to be successful, it must contain elements such as trust, honesty, transparency, reliability and accountability.

Key words: emergency situation, communication, messages, communications channels, communications tools

INTRODUCTION

At the beginning of the 20th and 21st centuries, the human population became more numerous and more technically and technologically advanced. That progress has brought with it numerous security risks. Paradoxically, increasing human progress has increased the sense of insecurity. With technological development, people increasingly consume existing natural resources and affect ecological systems, which leads to various forms of natural disasters. Natural disasters are often interconnected and caused. Although they are an integral part of human history, natural disasters have become more frequent and more devastating. The devastating effects of natural disasters, as well as technical-technological accidents and other social conflicts, lead to emergency situations.

The phrase "emergency situation" can be heard more and more frequently on television, read in newspapers or on the Internet. An emergency situation can be defined as a situation when the risks and threats or consequences of disasters and other events are of such scope and intensity that their occurrence or consequences cannot be prevented or eliminated by the regular action of competent services and authorities.

In emergency situations, all available communication channels should be used so that key messages reach the public as quickly and efficiently as possible. The use of new technologies and media is becoming an indispensable means of communication in emergency situations.

The roles of state bodies, institutions and the media are to provide timely information about the necessary measures that need to be taken, as well as to transmit of key messages to the public. For the communication process to be successful, it must contain elements such as trust, honesty, transparency, reliability and accountability.

EMERGENCY SITUATION

More and more frequent natural disasters are becoming a new reality. Natural disasters can cause a significant threat to the social community, endangering human lives, material goods and the environment. Social and anthropogenic factors also greatly contribute to the emergence of emergency situations.

The term "emergency situation" originated in Russian professional literature at the beginning of the 20th century. In the Dictionary of the Serbian language, the adjective extraordinary is defined as one that goes beyond the scope of normal, usual order, schedule or one that is special, exceptional, excellent, very large (Foreign language dictionary, 2011, p.122). The military lexicon defines the term situation as a circumstance, state, place, position, opportunity or influence of various circumstances and factors on combat actions (The military lexicon, 1981, p.559). Emergency situations represent a security situation, in which there is an irregular state of functioning of the social system or its parts, caused by events of a larger scale, which result in endangering the population, material goods and the environment (Mlađan, 2015, p.9). Violation of living and working conditions can be the result of natural disasters and disasters caused by unexpected events, which as a result cause unrest in and among people.

An emergency situation is characterized by unplanned disruption of normal life and work, the occurrence of material and financial damage, as well as the engagement of additional capacities from a wider area of the state for the purpose of mitigating and remediating the resulting consequences. Although it is often associated with natural disasters and disasters, the definition of an emergency situation includes any situation in which the engagement of various components is required, in response to events outside the normal course.

By means of the classification of emergency situations, it is possible to determine the place of one, concrete, emergency situation in the system of emergency situations. There are no identical emergency situations, but each is specific in itself. There are a number of characteristics, which may be universal, but by their nature and in the context of their existence, they are exclusively related to a specific emergency situation. Characteristics of emergency situations are: cause or causes of occurrence, unique and unrepeatable scenario of occurrence and development, reflections on the environment and severity of consequences. The above characteristics are the basis for the classification of emergency situations, that is, the characteristics of emergency situations are the basis for creating a list of classification criteria. Several criteria can be defined within one feature (Kovačević and other, 2020, p. 296). The most common classification is (Karović and other, 2019, str.13):

the cause of the origin, the stages of development, the speed of development and the scope and scale of the effects. The classification of emergency situations according to the cause of occurrence has the greatest practical application.

The classification of emergency situations according to the cause of occurrence can be conditionally divided into four basic groups (Mlađan, 2015, p. 28): natural, technical-technological, ecological and social. The sources of threats to the safety of natural nature include: geophysical phenomena, meteorological and agrometeorological phenomena, marine hydrological phenomena, hydrological phenomena, infectious diseases of humans and domestic animals, as well as the destruction of agricultural plants by diseases and pests. Emergency situations of man-made character include: transport accidents, fires, explosions, accidents with radioactive materials, accidents with biologically hazardous substances, hydrodynamic accidents and others, while emergency situations caused by environmental threats represent a group of emergency situations caused by man-made threatening events. The social causes of emergency situations are threatening phenomena in the form of social conflicts, which can be conditionally divided into: socio-political conflicts, military-political conflicts and complex humanitarian disasters.

An emergency situation goes through four stages in its development (Mlađan, 2015, p. 29). Deviation from the normal state is the first stage. This accumulation phase can last for days, months, years or decades. The second phase is characterized by the initiation of an extraordinary event, while the third phase is the culmination. The last, fourth phase is the calming phase, which includes the period of bringing the source of danger under control.

Depending on the speed of occurrence of threatening events, emergency situations are divided into: sudden, fast, moderate and gradual. Sudden emergency situations include explosions, earthquakes, terrorist attacks, etc. Fires, discharge of nuclear explosion products and hydrodynamic accidents are classified as rapid emergency situations. Moderate emergency situations are floods, volcanic eruptions, etc., while gradual are epidemics, environmental hazards, etc.

In terms of scope and scale, emergency situations can be: local, regional, national, international and global in nature (Mlađan, 2015, p. 30). The consequences of local emergency situations are limited to the boundaries of buildings, plants and complexes of economic entities and settlements, and in most cases, the consequences can be effectively removed by using forces and resources from the local level. The scope of local emergency situations includes the boundaries of local self-government units. Regional emergency situations are limited to the area of cities and districts, while national emergency situations cover the borders of the state or a large part of its territory. International or interstate emergency situations cross the borders of

one state and spread over the territory of several states. Global emergencies affect a large number of countries and continents.

COMMUNICATION AND EMERGENCY SITUATION

The famous Austrian psychologist, Paul Watzlawick, states in the first axiom of the theory of communication that man is a being who cannot help but communicate (Watzlawick, 1967, p. 48). Through communication, opinions, emotions, etc. are expressed, and it enables the transmission of messages and information.

The frequency and severity of natural, anthropogenic, technical-technological and social disasters highlights the importance of information transfer and proper reporting on the emerging situation. Information is crucial in all forms and phases of emergency management. The International Federation of Red Cross and Red Crescent Societies has declared information a basic need, stating that "people need information as much as water, food, medicine and shelter" (World Disasters Report, 2016, p. 275).

Communication is a form of communication between living beings. The same message can have different meanings for the participants in the communication. Understanding the message depends on a large number of factors. Incomplete and ineffective communication does not take into account the perception, knowledge and experience of individuals (the public) and is focused only on facts. Bad communication during an emergency causes mistrust, fear, panic and stress in the public.

Concept and basic characteristics of communication

The etymological origin of the word communication is in the Latin language (Latin communicare), which translated into Serbian means to communicate, participate, share or create something. (Latin dictionary, 2011, p. 605) There are dozens of different definitions of communication, but there is still no unified position on what communication is and how it is defined.

Communication is usually defined as the exchange of information or the exchange of ideas, attitudes, values, opinions, facts, etc. Information is a message that one actor of the communication process wants to convey to another (Čerepinko, 2012, p. 13). There are many reasons why people give or seek information, and this is why its effectiveness is important.

Communication is a process between at least two people, namely the sender and receiver of information. Every communication is characterized by information. Information represents data in a meaningful form. And meaningful information can be useless. Useful information is: accurate,

timely, complete and important. Accuracy of information refers to the reliability and indisputability of the information. Timely information is information that is provided at the right time. The information must be complete, in order to make a decision based on it. And finally, information is defined depending on the context.

The purpose of communication is: giving instructions, informing, directing, influencing, orientation, etc. Giving instructions refers to communications in the form of giving orders, which are transmitted from higher to lower levels. Informing is informing individuals or groups about specific issues. Guidance provides instructions and guidelines for further work.

The communication process includes: message sender, message content, message encoding, communication channels, message receiver, message decoding, response (feedback) and misunderstandings. Context and environment are important for a successful communication process. Successful mutual communication is one in which the receiver interprets the information as the sender intended. It is a condition that the communication participants use the same or very similar notification code. The transmission of the sender's ideas to the receiver and the receiver's response constitutes the process of communication. The process of communication begins when the sender wants to convey some information to the receiver, which has a certain meaning. The next step is to encode the message. The process of coding depends on the content of the message, the proximity of the sender and receiver, and other situational factors. After encoding the message, it is transmitted through the appropriate channel. The recipient decodes the message and responds with a response, which is a confirmation of whether the information was understood correctly or not. Misunderstandings are the products of information exchange problems in the communication process. Distortion of information, inadequate disposal of information, independent interpretation and interpretation, doubts about the veracity of information are some of the problems of information exchange.

Communications channels in emergency situation

Communication, in general, is the transfer of information between sender and receiver. The sender must choose the channel through which to send the information. The channel through which information is sent is called the communication channel and it is the medium for the transmission of information, in other words the link that connects the sender and receiver. Channels are the means by which a message travels from sender to receiver. Each medium has certain advantages and disadvantages. The public is looking for information to know if and how the emergency will affect them.

Individuals actively seek information from different sources, especially when they are aware that they have to make decisions that are of crucial importance for their lives.

The structure of information flow can also be called the network of information flow and represents the structure of the path through which information is sent and received. Information flow paths can be viewed from the aspect of oral and written ways of transmitting information. The use of these two ways of information flow is conditioned by the current situation. Verbal transmission of information is considered more effective, because the one to whom the message is sent sees and hears the one sending the message. This part of communication is manifested through tone of voice, body language, type of clothing, etc. The inconsistency of the message with the non-verbal part of the communication diminishes the importance of the message. On the other hand, conscious nonverbal influence can enhance the importance of the message.

The type of media used to transmit information is important for choosing a communication channel. The media should enable the successful transmission of information, so it is necessary to take into account: the amount and complexity of the information being transmitted, the speed of information flow, the speed of receiving feedback, ease of use, etc.

Information about an emergency situation reaches the public, most often, through the media. By the way they report on the newly created situation, the media influence its perception in the public. In addition, the media can contribute to the escalation or de-escalation of the situation, addressing responsibility, influencing the degree of trust between the public and the sender of the message. The media warn of possible dangers in the environment and represent an important source of information even before an emergency situation occurs. Response to information is shaped by social context, personal needs and belief in information. One of the problems is publicity, which is necessary for the media, so there are possible situations in which the media give information to the public for the sake of entertainment and information that the public wants to hear, and not what it really needs to know. Media representatives will report on everything if they are forced to work in a chaotic situation. This can cause huge consequences in the form of loss of public confidence in the professional team, disobedience and creating even more chaos.

In an emergency situation, the media are critical elements through which all important messages are sent to the interested parties of the public. In addition to the media, as the main communication channel, emergency situations require the use of other communication channels in order to send messages to interested parties. Communication channels can be different for different groups of actors. Sources or channels of information transmission

can be national and local television, radio, family members, friends, church, websites and others.

EFFECTS OF COMMUNICATION IN EMERGENCY SITUATIONS

Communication is one of the key elements in emergency management. Effective communication in emergency situations means that the public, the media and all interested parties are provided with basic information related to the emergency situation and that cooperation is established, with the aim of preventing the spread of the causes of the emergency situation and its devastating consequences.

Messages in emergency situations

An emergency situation is a situation when the risks and threats or the resulting consequences for the population, the environment and material and cultural assets are of such scope and intensity that their occurrence or consequences cannot be prevented or eliminated by the regular action of the competent authorities and services. This situation brings the population into a state of fear, ignorance and panic. Authorities are required to send messages to provide certain information and reassure the public.

The message is the central element of the communication act and the reason for the communication process. The goal of the message is to inform the target public about a specific issue. The first condition for successful communication is the use of the same code system by the communicator and the recipient, that is, the sender and receiver of the message. In addition, the messages sent must be simple and clear, in order to match the abilities of the widest audience, except when the communication is aimed at the professional public. It is crucial that the messages are understandable and devoid of jargon and professional terms. In order to arouse the interest of the media and the target public, messages should be shaped so that they have news value and answer the public's questions. The way messages are processed by the target audience depends on their interest and involvement in the situation.

In the initial response, it is necessary to provide reference information. All victims or potential victims of a crisis should receive information related to endangerment and instructions for acting in a crisis. It is necessary to say immediately what needs to be done to protect people. Key messages in the first moments should contain guiding information that helps people physically cope with the emergency situation. It is necessary to provide adequate instructions for behavior in an emergency situation, in order to protect people,

but also to prevent the spread of negative effects of an emergency situation. In addition to instructions, key messages should contain all basic and verified information about the emergency situation, as well as information about specific activities. In addition to the above, in the first moment it is necessary to show concern and sympathy with the victims of the situation.

Messages in emergency situations depend on the characteristics and type of event that occurred, as well as on the stage of development of the emergency situation. The most important are the first reactions and messages after the emergence of an emergency situation, in the first 24 hours. State institutions will send different messages depending on whether they are natural disasters, crisis and emergency situations caused by human factors or mechanical-technical accidents. The key elements that must be defined in the message are: who sends the message, what is its content, when and how it should be issued, that is, through which medium (Radovanović and other, 2022, p. 275).

When natural disasters occur, the public looks to the government and emergency services as the leaders in dealing with the emerging situation. The role of the army is also very important in those moments. The army provides information related to engagement in helping the population, and is also obliged to cooperate in communication with other organizations. Everyone who is in charge of communication must act harmoniously and send adequate messages (Karović, 2015, p. 197). From the onset of an emergency, it is important to articulate and repeat key messages.

During sudden disasters, proactive information must be offered to the community, including: currently available information, pre-preparedness information, updated information, and additional information (Karović, 2015, p. 197). Currently available information includes environmental conditions and various warnings. Information on preliminary preparation should include information on food, water, medical supplies, equipment, etc. The updated information contains reassurances to the public about preventive and other steps that emergency services and other relevant institutions are taking. Additional information includes important phone numbers and websites. All the messages sent are mainly instructive. The tone of communicating information must be soothing, but also sufficiently encouraging.

Man-made disasters can have severe psychological effects on responders, stakeholders and the public. The messages sent must be short, concise and to the point, but at the same time messages that talk about future steps. It is necessary to provide all available information, but also to explain why other important information about the investigation and other matters cannot be disclosed.

Incidents caused by technical-technological damage can create production and operational problems in various areas. Key messages, in such situations, should contain information about the details of the incident and the

events that led to the incident, as well as who is involved in the incident and what the consequences are.

An emergency situation, of any type, goes through four stages in its development: the accumulation stage, the initiation of an emergency event, the culmination stage and the calming stage. Each stage requires different information and messages. In the accumulation phase, messages are sent to take emergency and protective measures. When the phase of starting an emergency situation occurs, it is necessary to send messages rich in detailed, current information about the situation with the aim of raising people's awareness of a possible impending disaster. In the culmination and calming phase, messages and information about next steps, recovery and unwanted losses are expected.

In emergency situations, it is important to achieve continuity in communication so that the public remembers key messages. Repeating the message is necessary because not all members of the target public are able to see and hear the message at the same time. Different communication channels are often used in order to get the message to as many people as possible, using different media.

Whether the public will believe the messages depends on several factors, namely: the credibility of the source, the context of the message and the attitudes of the audience. Public trust and the history of previous information on an issue influence the degree of acceptance and interpretation of a new message (Kameron and other, 2006, p. 181). A bad reputation causes public suspicion even when meaningful and accurate messages are involved. For this reason, building a good reputation for the sender of the message plays an important role in emergency situations. Messages sent in emergency situations must be consistent with the actions of the sender of the message. If you claim one thing and do another, the public will not believe the messages.

Messages in emergency situations should be clear, truthful and credible, so that the public can understand, accept and trust the sender of the message. The first goal of communication in an emergency situation is to inform the public. Then, with appropriate communication tools, the public should be assured that everything is being done to eliminate the causes and consequences of the emergency situation.

Communication tools in emergency situations

Communication in emergency situations is a key tool in coordinating the responses of the authorities responsible for responding. Relevant information that is necessary for response authorities includes data on affected areas, size and distribution of damage, locations of the affected part of the population, data on potential rescue actions, etc. (Durham and other., 2008, p. 101). In the

conditions of emergency situations, the increasingly frequent use of social networks as an alternative way of communication is noticeable, because they enable large amounts of information to be distributed very quickly and efficiently to large groups of people in real time.

Several public relations techniques are distinguished: written, spoken, visual and new technology techniques. Written public relations techniques include: lists of media and journalists, announcements for the media, press releases, background information, press clippings, magazines, comments and columns, brochures, etc. Spoken public relations techniques include: conversations, press statements, interviews, press conferences, meetings, telephone conversations, audio media releases. Visual public relations techniques include: television appearances, video statements, photographs, films, ads etc. Techniques of new technologies include the use of the Internet, social networks, e-mail, etc. In emergency situations, different communication tools can be used, and it is crucial to choose the ones that are most adequate for marketing key messages to target audiences.

Effective communication includes: understandability, credibility and feedback. The sender of the information must be responsible for the information and credible, and the information must be complete, harmonized and redundant and adapted to the frame of reference of the recipient (Karović, 2015, p. 164). Communication tools in emergency situations should be fast, efficient and accessible. Some of the most commonly used communication tools include: press releases, press statements, press conferences, video conferences, interviews, press meetings, call center, photo and video news, use of experts, expert meetings, electronic mail, mobile phones and SMS messages, social networks, email, instant messaging applications, radio and television, billboards, meetings, personal tours.

A press release or press release is a form of conveying information to the public through the media. In emergency situations, announcements are most often sent in order to inform and warn the public about new circumstances. Announcements should have a standard form of document ready for publication. The text of the announcement is written on the sender's letterhead, no larger than two A4 pages. The announcement is written in the form of an inverted pyramid, which means that the most important information is placed at the beginning of the announcement, and the least important information at the end. The title of the announcement must be clear and concise. In the first paragraph, you should answer the key questions: who, what, how, why and where? It is very important that all the facts in the announcement be checked. You should not use symbols, jargon, dialect or hyperbole and euphemisms when writing the text. At the end of the text, it is necessary to indicate the contact person in charge of public relations.

Public statements, as well as press releases, should provide answers to the questions: who, what, how, why, where, what are the next steps, etc. Statements can be given in writing, by sending a statement via e-mail or verbally, by including in the program or by recording the statement. In emergency situations caused by natural disasters, it is possible to make a statement at the scene.

The press conference is another communication tool and is a formal event for the media that is convened when there is a need to convey some important information to the public. The conference should be organized as soon as possible, provided that the necessary information is available. For this event, it is necessary to prepare a special press release that will be read and distributed to journalists. It is necessary to answer questions such as: what happened, are there dead or injured, how much is the damage, why did it happen, who is responsible, were there warning signs, when will it be finished. At the end of the conference, it is important to give the journalists a written statement that contains all the key factors that were announced at the conference. Additional materials may be attached to the announcement. In cases where it is necessary, it is possible to organize a video transmission of the press conference. A press conference is one of the most important tools in an emergency situation and a practical way of communicating information, because it gathers journalists in one place and thus saves time and resources.

A telephone center with operators who provide information 24 hours a day can be of great importance in emergency situations. It is necessary to inform the public about the existence of telephone exchanges for free calls and the provision of help and support.

The information technology revolution has resulted in new forms of connection and communication between people. The development of new technologies also led to the development of applications better known as social networks. Social networks enable interaction and exchange of information in a way that was not possible twenty or thirty years ago. Social networks can be used as a primary means of communication or as an additional means of communication. Thanks to its options, social networks provide an opportunity for quick, cheap and effective dissemination of information. The combination of the ability to spread information to a network of people, who are online, and the ability to further spread information from the original group of people, electronic and non-electronic, to those who are not or need not be online, indicates a segment whose strengthening can improve the characteristics of the social networks themselves. networks as communication tools (Šekarić, 2015, p. 118). A key feature of social networks is the possibility of two-way communication between a large number of people. In recent years, the most dominant social networks are Twitter and Facebook. In addition to social networks, social media also includes: blogs and microblogs, services for

sharing multimedia content, video content and photo sharing, content tagging services, Internet forums, review services and virtual worlds (Vučinić, 2015, p. 220).

Social networks can also represent a platform for spreading incorrect information. Inaccurate information can cloud the perception and level of awareness of the current situation and compromise safety. The spread of inaccurate information hinders or prevents efforts to respond adequately to emergency situations.

CONCLUSION

Emergency situation requires special measures, forces and means with an increased work regime of competent and other authorities, in order to prevent or eliminate the consequences for the population, the environment, material and cultural assets. In such a situation, messages that provide information to the public are important. Messages in emergency situations depend on the characteristics and type of event that occurred, as well as on the stage of development of the emergency situation, but the most important are the first reactions and messages after the occurrence of the emergency situation, in the first 24 hours. The key elements that must be defined in the message are: who sends the message, what is its content, when and how it should be issued, through which medium. The sender of the information must be responsible for the information and credible, and the information must be complete, harmonized and redundant and adapted to the frame of reference of the recipient. The main goal of successful communication in emergency situations is to create trust. Communication tools in these situations should be fast, efficient and accessible, and social networks provide the opportunity for quick, cheap and effective dissemination of information.

Communication, in general, is the transfer of information between sender and receiver. One of the problems when using the media in emergency situations is publicity. Publicity is necessary for the media, so situations are possible in which the media give information to the public for the sake of entertainment and information that the public wants to hear, and not what it really needs to know. Media representatives will report on everything, if they are forced to work in a chaotic situation. This can cause huge consequences in the form of loss of public confidence in the professional team, disobedience and creating even more chaos. The problem with social networks is the ability to spread incorrect information at the same speed as the spread of true and useful information. Inaccurate information can cloud the perception and level of awareness of the current situation and compromise safety. The spread of

inaccurate information hinders or prevents efforts to respond adequately to emergency situations.

REZIME
USPEŠNE KOMUNIKACIJE KAO ELEMENT EFIKASNOG UPRAVLJANJA VANREDNIM SITUACIJAMA

Iako su sastavni deo ljudske istorije, prirodne katastrofe su postale sve učestalije i razornije. Razorni efekti prirodnih katastrofa, ali i tehničko-tehnoloških nesreća i drugih društvenih sukoba, dovode do nastanka vanrednih situacija. Vanredna situacija se definiše kao stanje kada su rizici i pretnje ili posledice od katastrofa i drugih događaja takvog obima i intenziteta da njihov nastanak ili posledice nije moguće sprečiti ili otkloniti redovnim delovanjem nadležnih službi i organa. Za uspešno upravljanje vanrednom situacijom značajna je komunikacija. Neophodno je koristiti sve dostupne kanale komunikacije kako bi ključne poruke što brže i efikasnije došle do javnosti. Upotreba novih tehnologija i medija postaje neizostavno sredstvo komunikacije u vanrednim situacijama. Uloga državnih organa, institucija i medija jeste da pruže blagovremene informaicije o neophodnim merama koje je potrebno preduzeti, kao i prenos ključnih poruka javnosti. Da bi proces komunikacije bio uspešan, mora sadržati elemente poput poverenja, iskrenosti, transparentnosti, pouzdanosti i odgovornosti.
Ključne reči: vanredna situacija, komunikacija, poruke, komunikacioni kanali, komunikacioni alati

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THE ANALYSIS OF FOREIGN TRADE IN SERBIA AND NORTH MACEDONIA

ABSTRACT: The Western Balkans region has directed its economic growth and development through the integration of national economies into international trade flows. Given that all countries in the region have faced the consequences of the Covid-19 pandemic, the overall situation has also affected foreign trade relations. Although the European Union has been the largest trade partner of the countries in the region in recent decades, the presence of the People's Republic of China and its influence on the region's trade is becoming more and more noticeable. The aim of this paper is to analyze the state of foreign trade in the cases of Serbia and North Macedonia, as the countries of the Western Balkans region, and to point out the directions of future trade

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relations in the cases of these two countries. The research is based on descriptive data analysis in the period 2010-2020, while the data used are available in international and domestic statistical databases. The paper consists of three chapters. After the introduction, the first chapter analyzes the dynamics of foreign trade in the Western Balkans. The second chapter is based on the analysis of the trend of foreign trade in Serbia, while the third chapter analyzes the trend of foreign trade in North Macedonia. Finally, concluding remarks are given. The results of the research showed that the current state of foreign trade was greatly affected by the pandemic crisis, but that the perspectives are mainly focused on increasing trade with the EU and China. Even though starting from 2020 there was a decline in economic activity and a slowdown in global trade, the value of foreign trade in these countries has increased, but with rising foreign trade deficit.

Keywords: data analysis, foreign trade, Serbia, North Macedonia

INTRODUCTION

The inclusion of countries in international trade flows is one of the key preconditions for economic growth and development. Various studies confirm the causal link between economic openness and income distribution (Huchet et al., 2018), which ensures sustainable economic growth (Pradhan et al., 2017) and development. Also, the positive impact of international trade on economic growth in developing countries was confirmed (Tahir, Azid, 2015). The economies of the Western Balkans region (Albania, Bosnia and Herzegovina, North Macedonia, Montenegro and Serbia including Kosovo and Metohia (KM)[4]) are considered to be in developing stage with relatively modest participation in the world trade. The reason for this is their slow transition, war conflicts and unstable policies which are reflected in insufficient economic development. That is why they are facing the challenges of new ways of production and thus exports (Nikolić, 2020), on a quest for sustainable development.

In the Western Balkans region, trade is one of the most important goals of economic cooperation, both within the countries of the region and with the countries of the European Union (EU), which has been the most important trade partner for decades. The share of trade and exports of the region in

[4] All references to Kosovo in this document should be understood in the context of United Nations Security Council resolution 1244 (1999).

economic performance is still not significant, which is a consequence of insufficient openness, reliance on lower value-added products and insufficient competitiveness (IMF 2019). In recent years, foreign trade with China „has become increasingly important“ (Jacimovic et al., 2018). Through the "17 + 1" mechanism, based on the "Belt and Road" initiative, which, among other projects, affects the increase of trade (Filipovic, Ignjatovic, 2021a), 12 countries of Central and Eastern Europe[5] and 5 countries of the Western Balkans[6] and China are strengthening EU-China relations (Filipovic, Ignjatovic, 2021b). The countries of the Western Balkans are uncompetitive “in terms of size and economic influence in international trade compared to China” (Beraha, Jovicic, 2021), while Serbia achieved very good results and doubled trade in the last ten years with China (Beraha, Jovicic, 2021).

In addition, at the beginning of 2020, the emergence of the COVID-19 pandemic become a global phenomenon. Countries in the region are still facing the consequences of the pandemic that has seriously threatened global economy (Ignjatovic et al. 2021) and disrupted global trade, which was 8.9% lower in 2020 than it was in 2008 during the global economic crisis (Diclinson, Zemaityte, 2021). While forecasts point to a further slowdown and decline in global economic activity and trade (Ignjatovic, et. al. 2020), the length and depth of economic consequences as well as the duration of economic recovery are still unknown (Kisin et al. 2021, 2022).

Therefore, the aim of this paper is to analyze the state of foreign trade in the cases of Serbia and North Macedonia and to point out further directions of trade relations in the cases of these two countries. The structure of the paper is organized so that the first chapter analyzes the dynamics of foreign trade in the Western Balkans. The second chapter is based on the analysis of the trend of foreign trade in Serbia, while the third chapter analyzes the trend of foreign trade in North Macedonia. In the end, certain conclusions were drawn.

DYNAMICS OF FOREIGN TRADE IN THE WESTERN BALKANS

The emergence of the COVID-19 pandemic has primarily disrupted trade through global value chains, while the supply and demand shock has strongly impacted trade in goods and services in the Western Balkans. Closing

[5] These are Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, and Greece.

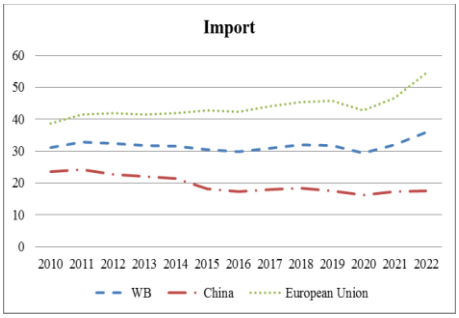
[6] These are Albania, Bosnia and Herzegovina, North Macedonia, Montenegro, and Serbia. KM is not a separate member of the co-operation as it has not been recognized by China.

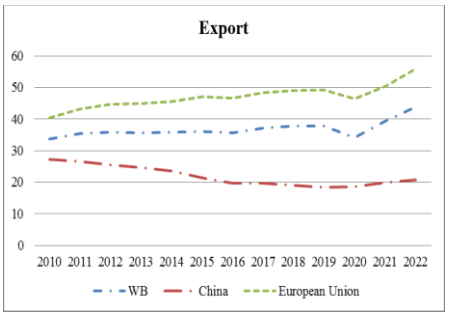
borders has disrupted global trade flows, while tackling the pandemic has weakened demand, leading to problems in countries with a leading tourism sector, where the slowdown depends on health impacts and pandemic response policies. In addition, in terms of trade, the pandemic affected transport, especially air transport, and catering, as well as trade-in products such as automotive parts, industrial products, and base metals. This further negatively affected the results of trade integration, which the countries of the Western Balkans have achieved in recent years (Ignjatovic et. al. 2021). As international trade in the countries of the region makes a great contribution, that is why these countries are becoming more open to business.

Given that all countries in the region are continuously developing trade, their openness to trade is above the average of Europe and Central Asia (ECA) region, but still below the average of Central and Baltic countries, although North Macedonia and Serbia meet that standard (World Bank, 2022a). Nevertheless, international trade integration with EU countries is one of the most important factors of economic growth for all countries in the Western Balkans region. "The EU was the main trading partner of the Western Balkans as measured by both, exports (69%) and imports (54%) in 2020, manufactured goods made up 77% of EU exports to and 80% of EU imports from the Western Balkans" (Eurostat, 2022). The involvement of national economies (Bosnia and Herzegovina, North Macedonia, and Serbia) in global value chains is of great importance (Beraha, Jovicic, 2021). Despite that, the region's great focus on EU countries puts these countries in direct danger of disruption in the European market, so the pandemic affected the economies of EU countries and affected the countries of the Western Balkans. The crisis has led to a change in the intensity of exports (Nikolic, 2021) and a decline in GDP, which in 2020 averaged -3.1% of GDP in the region. In the same year, the EU recorded a decline of 3.8% of GDP, while on the other hand, China achieved a growth of as much as 2.3% of GDP (World Bank, 2022b). Although estimates indicated that China will achieve growth of 8.1% of GDP in 2021 (Tianiu, 2022), a record of 8.4% was achieved, which is a consequence of the implementation of effective Chinese measures in the fight against the spread of the COVID-19 virus. According to World Bank data (2023), the EU achieved growth of 5.5% in 2021, while the countries of the region averaged 8.4%, same as China. In the following year 2022, China recorded 3.0%, the EU 3.5%, and the region 3.8% of GDP. Observing the import of goods and services data, in 2020 the Western Balkans region recorded as much as 54.8%, the EU 42.9%, and China 16.0% of GDP (Chart 1). In the same year, observing exports of goods and services data, Western Balkans region accounted for 35.3%, EU 46.6% and China's 18.5% of GDP (Chart 2). However, in 2021, the import of goods and services amounted to 61.0% in the countries of the Western Balkans, 46.7% in the EU and 17.4% in China, while exports of goods

and services in the region accounted for 47.3%, 50.4% in the EU and 19.9% of China's GDP.

Charts 1 and 2. Import and Export of goods and services (% of GDP), Western Balkans, EU and China, 2010-2022.





Source: World Bank, 2022b.

However, compared to 2019 the pandemic in 2020 also affected the reduction of the region's international trade with the EU (7.8%) (European Commission, 2021), which strengthened China's economic presence in the Western Balkans. The trade exchange between the region and China in the period 2015-2016 amounted to 3.3 billion (Rudić, 2017), after which it recorded constant growth. However, although the pandemic caused a decline in economic activity, the international trade exchange between the region and China reached as much as US $ 5.2 billion in 2020, which is 1.9 billion more than in the period 2015-2016. However, there was an increase in the trade deficit, where the value of exports of the countries of the region in 2020, totaled 1.1 billion US dollars, while the value of imports amounted to 4.1 billion US dollars. If viewed individually by country, the largest trade in 2020 was achieved by Serbia (40%) (United Nations, 2022). In pandemic conditions, China has practically become the only supplier of medical equipment and pharmaceuticals for the entire Western Balkans region.

REVIEW OF THE TREND AND VOLUME OF SERBIA'S FOREIGN TRADE

After a period of global economic crisis and sanctions (Filipović, Ignjatović, 2023), more favourable times for Serbia finally started in 2000. With the lifting of sanctions, the country is included in international financial and economic flows, which started the recovery of the economy, and thus the growth of foreign trade exchange. Nevertheless, Serbian imports only reached

the level of 1990 in 2003, while on the other hand, exports approached that level only in 2005.The next period (2006-2008) is characterized by a significant increase in imports, exports and a dramatic increase in the deficit (Crnomarković, 2010). However, the period 2008-2018. was characterized by numerous changes in the volume of Serbian foreign trade. This means that as a result of the world economic crisis and the sharp decline (2009-2012), there was stagnation. Imports amounted to about 19,000-20,000 million USD, and exports about 11,000 - 12,000 USD, although a slight increase in foreign trade exchange was already recorded in 2010. "Following this dynamic, the negative trade balance did not have significant oscillations and ranged from around 7,000- 8,000 million USD" (SORS, 2022c). The period 2013-2014 was very successful in terms of foreign trade, by achieving significant growth in exports and slightly lower imports, which resulted in a reduction in the foreign trade deficit. „The structure of Serbian exports, especially to the EU was very unfavorable, but after the Great Recession some progress was made, e.g. through a decline in the share of resource-intensive products" (Nikolić, 2014). Soon (2005) there was a decline in the volume of foreign trade exchange. Years 2016 and 2017 were successful in respect to the growth of imports and exports, with a positive foreign trade balance (Chart 3).

Chart 3. Import/Export of Serbia, 2010-2022 (millions USD)

Source: SORS, 2022c.

As can be concluded from the presented Chart 3, favourable foreign trade results were achieved immediately before the start of the pandemic, although it was accompanied by a foreign trade deficit. "The total foreign trade

of Serbia in 2019 increased by 2.8% compared to 2018, with an increase in exports of 2.0% and imports of 3.3%, but accompanied by the largest increase in the foreign trade deficit of 6.8% compared to 2018“ (SORS, 2022a). The impact of the pandemic on the volume and structure of trade in Serbia was not pronounced and it is characterized by stagnation. According to official data (SORS, 2022c), “the total volume of foreign trade in Serbia in the first year of the COVID-19 pandemic decreased by 1.4% compared to 2019“. Exports in 2020 were lower by 0.7% and imports by 1.9% than in the previous year. The foreign trade deficit even achieved the largest reduction of 5.1% compared to 2019. “During the second year of the pandemic, Serbia achieved numerous economic results, which refers to the value of the volume of foreign trade, which was a record in 2021. The total foreign trade of Serbia in 2021 increased by 29.8% compared to the same period the year before. Exports, in the amount of 25.563,5 million USD, achieved a growth of 31.1%. Goods worth 33.797,0 million USD were imported which is 28.8% more than in 2020. The foreign trade deficit increased by 22.3% compared to 2020 and amounted to 8.233,4 million USD. The coverage of imports by exports last year was 75.6% which is higher than the coverage in 2020 when it was 74.3%“ (SORS, 2022c). In terms of the most important trade partners, for many years, the largest foreign trade exchange was with partner countries based on the signed free trade agreements.

Traditionally, Europe and the European Union are the most important geographical and economic zone for Serbia in terms of trade, with which it realizes over 60% of total trade. The CEFTA countries are Serbia's second most important trade partner, with which it has a trade surplus. It is the result of exports of: oil and its derivatives, iron and steel, agricultural products (cereals and their products), electricity and electric machines. “When it comes to foreign trade by country of destination and origin, Germany is the partner with which Serbia achieves the largest imports and exports trade“ (SORS, 2022b).

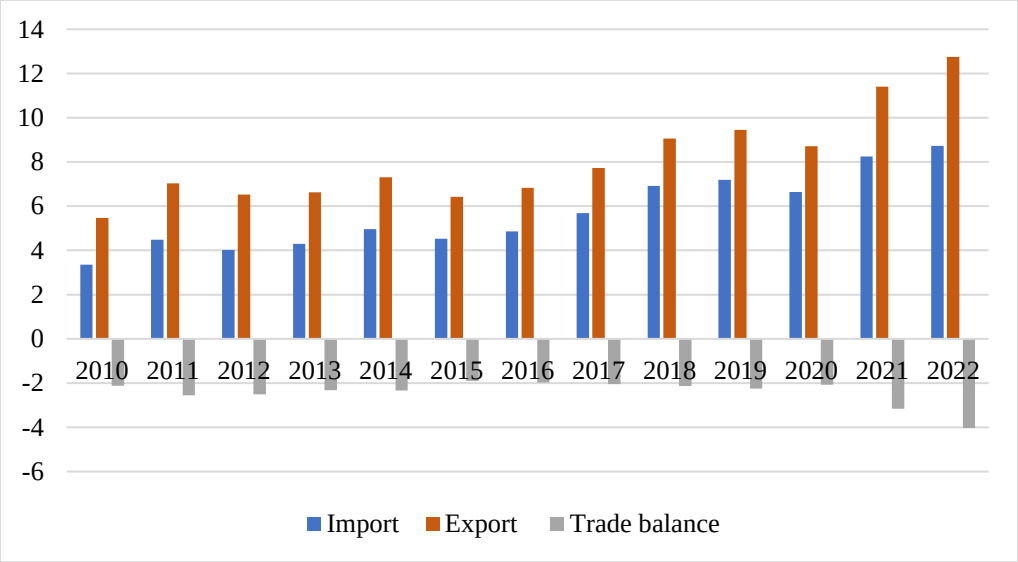
REVIEW OF THE TREND AND VOLUME OF NORTH MACEDONIA'S FOREIGN TRADE

The Covid-19 pandemic had an enormous impact on the export and import policy of North Macedonia. The pandemic contributed to a significant drop in product exports, especially in traditional export sectors, as well as in industrial zones. An exception was evident in product categories such as textile yarns and medical and pharmaceutical products due to increased demand for these products during the pandemic crisis. The disruption of supply chains that occurred as a result of the pandemic crisis, and thus the

slowdown of production in the USA, the EU, and China, were one of the channels for the transmission of the crisis in North Macedonia, contributing to a decrease in imports from major trading partners. As a result, the export and import from the main trade partners, especially from the largest trade partner for import and export, Germany, decreased significantly. The trend of the movement of Macedonian imports is under the huge influence of export achievements. Most of the imports of raw materials come from new foreign export facilities, which contributed to the increase in imports of “non-ferrous metals, transport equipment, chemical products, machinery, and energy components" (SITC, 2022). According to Stancheva Gligov (2020), the EU was the region most affected by the pandemic and it affects the import of industrial parts and components. Furthermore, exporting automotive parts or electronics requires importing a significant proportion of foreign parts, particularly from the EU and China. The most important foreign trade of the Macedonian economy with a share of about 70% in the total foreign trade exchange is the EU, while Germany, Belgium, and Bulgaria are the most dominant export partners. Significant contributions are made by imports of precious metals from the United Kingdom (Miteva-Kacarski, et al. 2021), slightly higher energy imports from Greece, as well as imports of equipment and machinery from Serbia (SITC, 2022). Imports from China are of great importance for North Macedonia.

Machines, chemical products, and transport equipment are among the most represented export products. From the group of traditional export sectors, only symbolic exports of iron, steel, and clothing were registered. In the conditions of pandemic, part of the export facilities suspended production, which also affected the total export activity, that is, a decrease in the export of machinery, transport equipment, and chemical products. Namely, these are products that create export capacities, most often in industrial zones. This state is noticeable in the second quarter of 2020 (with a decline of about 50% annually), which led to a decline in industrial production (The Ministry of Finance of the Republic of Macedonia, 2022). The highest trade deficit, measured in absolute terms, was recorded by the Macedonian economy in the year 2021, as a result of the global economic crisis caused by Russia's invasion of Ukraine (Chart 4). Considering imports as % of GDP, the highest level was registered in 2019, before the escalation of the pandemic crisis, in the amount of 76.2%, while exports accounted for 62.4% (World Bank, 2022).

Chart 4. Import/Export of North Macedonia, 2010-2022. (millions USD)



Source: State Statistics Office of the Republic of North Macedonia, 2022.

In addition to some trade measures that can contribute to mitigating the effects of the crisis, the opening of the market for basic products is considered to be able to contribute to avoiding large price changes. Therefore, it is particularly important to properly design export restrictions to avoid barriers to trade and disruption of global supply chains. North Macedonia should increase trade flows of certain products, as companies around the world will reconsider their dependence on highly concentrated supply chains, which will open new opportunities and markets (Stancheva Gigov, 2020).

CONCLUSION

The results of the research showed that the current state of foreign trade was greatly affected by the pandemic crisis, but that the perspectives are mainly focused on increasing trade with the EU and China. Although in 2020, there was a decline in economic activity and a slowdown in global trade, the value of foreign trade in these countries has increased, but with the growth of the foreign trade deficit. In the future, the structure of international trade of the Western Balkan countries will be under influence by a mixture of shocks on the supply side, which will be transmitted through global value chains, and on the demand side, due to the recession at the most important trading partners. Thus, structural trade differences will influence the trade, so Albania, Kosovo and Metohija, as well as Montenegro are likely to see an increase in the current account deficit, precisely because of the high reliance on exports of tourism-related services. On the other hand, Bosnia and Herzegovina, North

Macedonia, and Serbia are better integrated into the global value chain, resulting in high exports of goods. In the future, the implementation of incentivized trade measures, such as tariff reductions, will be crucial to reducing interferences in international trade.

After period of sanctions and the war in 1999, it was very difficult for Serbia to rebuild trade relations with the old partners. Still, Serbia had achieved an upward trend till 2009. As a consequence of the Global Financial Crisis in 2008, Serbia had stabilization process and stagnation period until 2012. This was followed by the five-year period 2012-2016 of considerable export increase and a reduction in the foreign trade deficit. From 2017 Serbia has achieved strong growth trend of all trade indicators. This was halted in 2020 due to the COVID-19 pandemic crisis. Presented data show that Serbia ended the year 2020 at the same level as 2019, and had just that one-year stagnation. Already in 2021, it was extremely successful with incredible growth in one year. The import and export structure has been almost the same for years, as there have been no changes in the market structure, because traditionally most of Serbia's trade is with European Union countries, primarily Germany and Italy as the most important individual countries.

In North Macedonia, pandemic has led to a drop in exports of products to industrial zones and traditional export sectors. Exceptions are textile yarns and medical and pharmaceutical products. The the most important foreign trade partner is the EU, while Germany, Belgium, and Bulgaria are the most dominant export partners. Significant contributions are made by imports of precious metals from the United Kingdom, energy imports from Greece, as well as imports of equipment and machinery from Serbia. To avoid trade barriers and disrupt global supply chains, the economy of North Macedonia needs to increase trade flows of certain products and conceptualize export opportunities.

REZIME
OBIM SPOLJNE TRGOVINE SRBIJE I SEVERNE MAKEDONIJE

Region Zapadnog Balkana usmerio je svoj ekonomski rast i razvoj kroz integraciju nacionalnih ekonomija u međunarodne trgovinske tokove. S obzirom na to da su se sve zemlje u regionu suočile sa posledicama pandemije Covid-19, ukupna uticala je i na spoljnotrgovinske odnose. Iako je Evropska unija najveći trgovinski partner zemalja regiona poslednjih decenija, prisustvo NR Kine i njen uticaj na trgovinsku razmenu regiona sve je uočljiviji. Cilj ovog rada je da se analizira stanje spoljnotrgovinske razmene u slučaju Srbije i Severne Makedonije kao zemalja regiona Zapadnog Balkana i da ukaže na pravce budućih trgovinskih odnosa u slučaju ove dve zemlje. Istraživanje je

zasnovano na deskriptivnoj analizi podataka u periodu 2010.-2020., a korišćeni podaci dostupni su u međunarodnim i domaćim statističkim bazama podataka. Rezultati istraživanja su pokazali da je na trenutno stanje spoljne trgovine u velikoj meri uticala pandemijska kriza, ali da su perspektive uglavnom usmerene na povećanje trgovine sa EU i Kinom. Iako je u 2020. godini došlo do pada privredne aktivnosti i usporavanja globalne trgovine, vrednost spoljnotrgovinske razmene u ovim zemljama je porasla, ali uz rast spoljnotrgovinskog deficita.

Ključne reči: analiaza podataka, spoljna trgovina, Srbija, Severna Makedonija

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