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ЗА ЕКОНОМСКУ ТЕОРИЈУ И ПРАКСУ И ДРУШТВЕНА ПИТАЊА



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18000 Ниш, Максима Горког 5/36

Телефон Редакције: +381 (0)18 4245 763; 211 443
е-маил: zoki@medianis.net; ekonomika@sbb.rs WEB: <http://www.ekonomika.org.rs>
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Address:

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Nataša Kljajić¹
Biljana Grujić Vučkovski²
Zoran Simonović³
Institute of Agricultural Economics, Belgrade

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VEGETABLE PRODUCTION IN THE REPUBLIC OF SERBIA – PRESENT STATE AND PROBLEMS⁴

Abstract

The aim of the research in this paper is to consider the state and basic trends of vegetable production in the Republic of Serbia for the period from 2012. to 2020. Therefore, the paper indicates which necessary measures should be taken to increase the volume of vegetable crop production in our country and improve the production. In spite of all problems, and owing to significant but insufficiently used local resources (people) and favourable natural conditions (climate features, soil and water resources), vegetable production in the Republic of Serbia has a good opportunity for intensive development. This development has to be accompanied by the appropriate credit and monetary support, investment and incentives.

Keywords: *plant production, vegetable crop production, average annual rate of change, selling prices*

JEL classification: *Q000, Q110, Q150*

ПРОИЗВОДЊА ПОВРЋА У РЕПУБЛИЦИ СРБИЈИ - СТАЊЕ И ПРОБЛЕМИ

Резиме

Циљ истраживања у овом раду је сагледавање стања и основних трендова кретања повртарске производње у Републици Србији за период 2011-2020. година. Сходно томе, указано је на неопходне мере које треба предузети како би се остварило повећање обима производње повртарских култура у нашој земљи и унапредила производња. Упркос свим проблемима, а захваљујући постојању значајних а недовољно искоришћених локалних ресурса (становништво), као и повољних природних услова (климатске карактеристике, земљиште и водни ресурси), повртарска производња у Републици Србији има шансе за даљи

¹ natasa_k@iep.bg.ac.rs. ORCID ID 0000-0003-2245-8285

² biljana_g@iep.bg.ac.rs, ORCID ID 0000-0003-2588-4888

³ zoran_s@iep.bg.ac.rs ORCID ID 0000-0002-2769-6867

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интензивни развој уз спровођење одговарајуће кредитно-монетарне, инвестиционе и подстицајне подршке.

Кључне речи: биљна производња, повртарство, просечна годишња стопа промене, продајне цене

Introduction

The Republic of Serbia has favourable climatic conditions and good soil and water potential for vegetable crop production. Consequently, it can be defined as a *traditionally vegetable-growing country* with diverse production. Bearers of vegetable growing are rural areas where production is still mainly conducted in open fields. However, there is a constant tendency of increasing the areas with greenhouses and glasshouses as protected areas with controlled production conditions. The possibility of growing vegetable crops both in open fields and in protected areas enables all-year-round production, which leads to significant production and economic differences. Economically speaking, the most significant difference is the fact that faster maturation of vegetables in protected areas results in significantly enhanced production profitability (Kljajić et al., 2013).

If the total agricultural production in our country is taken into account, vegetable production represents one of the most intensive branches of agriculture. This is confirmed by crop yield, generated income, net income, as well as the share of human labour. Open-field vegetable production reaches a 5 to 8 times greater production value in comparison to wheat production, while it is as many as 190 to 250 times greater in protected areas (Ševarlić et al., 2011). The vicinity of the market has a great impact on production. Thus, villages closer to large towns are better positioned, while villages in hilly and mountainous areas which are distant from large towns have a smaller number of vegetable crops at their disposal to be cultivated successfully and transported to large market places.

Grujić et al. (2014) believe that the relevant ministry should be more involved in suggesting appropriate agricultural measures in the field of vegetable production.

The data in Table 1 show that during the observed 9-year period the greatest annual share in the arable land structure was realised by cereals for the production of grain, both at the level of the EU-27 (54.1%) and in the area of Serbia (67.2%). It can be noticed that Serbia also has a greater average annual share of the areas cultivating industrial crops (16.3%) in comparison to the EU-27 (10.6%). However, the areas cultivating strawberries have the lowest average annual share in the total arable land, both at the EU-27 level (0.1%) and in the territory of Serbia (0.2%). When it comes to vegetable production, vegetables are grown on only 2% of the EU 27 area, while this share is slightly greater in Serbia (2.4%).

Table 1. Arable land structure at the level of the EU-27 and Serbia from 2012 to 2020 (in %)

Year	Cereals for the production of grain (% in arable land)		Dry pulses and protein crops (% in arable land)		Root crops (% in arable land)		Industrial crops (% in arable land)		Plants harvested green (% in arable land)		Fresh vegetables (% in arable land)		Strawberries (% in arable land)	
	European Union -27 countries	Serbia	European Union -27 countries	Serbia	European Union -27 countries	Serbia	European Union -27 countries	Serbia	European Union -27 countries	Serbia	European Union -27 countries	Serbia	European Union -27 countries	Serbia
2012	55.2	67.0	1.3	0.5	2.9	4.7	11.2	14.3	0.0	10.7	2.0	2.6	0.1	0.2
2013	55.1	67.9	1.2	0.5	3.2	4.5	11.9	14.1	0.0	9.8	1.8	2.4	0.1	0.2
2014	54.9	69.7	1.4	0.4	3.1	4.5	11.9	13.4	0.0	9.8	1.9	2.4	0.1	0.2
2015	54.5	67.9	2.0	0.5	2.9	3.2	12.0	14.4	19.2	9.7	2.0	2.6	0.1	0.2
2016	54.2	67.7	2.1	0.5	3.1	3.4	12.1	15.7	19.5	9.1	2.1	2.7	0.1	0.2
2017	52.6	65.9	2.4	0.6	3.3	3.6	0.0	17.4	19.7	9.2	2.0	2.8	0.1	0.3
2018	52.9	66.3	2.2	0.4	0.0	3.0	12.6	19.1	0.0	8.9	2.0	2.2	0.1	0.3
2019	53.9	65.9	2.0	0.4	3.2	3.0	11.6	19.0	0.0	9.4	2.0	2.1	0.1	0.3
2020	53.1	66.8	2.1	0.4	3.1	2.6	12.2	19.0	0.0	9.0	2.0	2.0	0.1	0.3
<i>Average per year</i>	<i>54.1</i>	<i>67.2</i>	<i>1.9</i>	<i>0.5</i>	<i>2.8</i>	<i>3.6</i>	<i>10.6</i>	<i>16.3</i>	<i>6.5</i>	<i>9.5</i>	<i>2.0</i>	<i>2.4</i>	<i>0.1</i>	<i>0.2</i>

Source: EUROSTAT database, Crop production in national humidity.

The agricultural sector has a huge political and economic significance for our country. Still, there is an increasing number of problems related to agricultural production. Fragmentation of properties and age structure of agricultural holdings are certainly some of its weakest points (Kljajić et al., 2011). These could be solved by associating agricultural producers in order to facilitate the response to the large and constant offer of foreign buyers. Our country generates a surplus when trading with vegetable products. However, it has far greater possibilities owing to its natural and other resources required for vegetable production. Since Serbia is a signatory of various international trade agreements, the imported goods are also available on the vegetable crop market, which creates competition to domestic producers (Moravčević Đ. et al., 2021). One of the important factors which limit vegetable production is the unregulated market in terms of the presence of a large number of “middlemen”. Middlemen dictate low prices of vegetables and thus prevent producers from gaining the desired income from production. At the same time, this makes them less motivated to deal with vegetable production and/or to broaden their production area (Bodiroga R., 2020).

In addition, old-fashioned production technology, lack of appropriate machinery, inadequate irrigation and drainage systems, insufficient financial incentives and alike are the limitations which prevent this sector from reaching its full potential (Zelenović V. et al., 2018).

Materials and methods

This paper involves the research period from 2012 to 2020 and includes the analysis of the areas and realised yield of selected vegetable crops in the Republic of Serbia. The authors used data of the Statistical Office of the Republic of Serbia in Belgrade, as well as the available scientific and professional literature dealing with this topic in order to understand the state and production results of the vegetable production in Serbia. The EUROSTAT Database was used for calculating the arable land structure at

the level of the EU-27 and Serbia for the period from 2012 to 2020. The methodology of data comprehensiveness according to individual categories was defined in the document named the Integrated Farm Statistics Manual (2020)⁵. For the needs of the paper, and in order to show the structure of the arable land category, the share of the following subcategories was presented: cereals for the production of grain, dry pulses and protein crops, root crops, industrial crops, plants harvested green, fresh vegetables (including melons) and strawberries. The arable land also involves flowers and ornamental plants, seeds and seedlings, other arable land crops and fallow land, but the related data from the EUROSTAT Database were not available at the time of writing this paper.

The authors' aim was to show the yield of the mentioned crops represented in the arable land at the level of the EU-27 and Serbia using the EUROSTAT Database. However, data availability is not at the appropriate level and it is not possible to create an adequate time series. This situation would consequently lead to inadequate interpretation of the data. Therefore, the data on the crop yield are presented only for the Republic of Serbia using the data of the Statistical Office of the Republic of Serbia (SORS) for the analysed period.

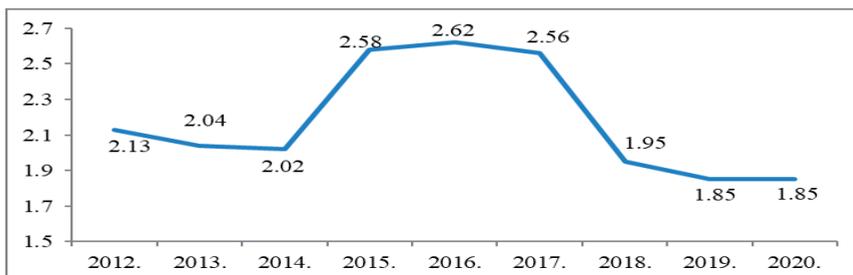
The data are presented in the form of tables and graphs while applying standard mathematical and statistical methods.

Research results

The holdings of vegetable producers mainly consist of several production lines. This involves the production of smaller quantities of vegetables intended for the personal needs of the holdings. This kind of production is mostly conducted in house gardens where a certain level of specialisation is evident. However, modern machinery and technical and technological innovations have to be applied in the market-oriented vegetable production.

According to the data of the Statistical Office of the Republic of Serbia in Belgrade for the 2012-2020 period, the share of the areas cultivating vegetables in the total sown arable land in the Republic of Serbia varied from 1.85% in 2019 and 2020 to 2.62% in 2016 (Graph 1).

Graph 1. Average annual share of the vegetable areas in the arable land in the Republic of Serbia from 2012-2020 (in %)



Source: The authors' calculations according to the SORS data, Belgrade.

⁵According to this source, the utilised agricultural area (UUA) consists of arable land, permanent grassland, permanent crops and kitchen gardens (<https://ec.europa.eu/eurostat/documents/3859598/11495053/KS-GQ-20-009-EN-N.pdf/6f2e2660-9923-4780-a75c-c53651438948?t=1604911800000>).

The official statistics monitors 11 vegetable crops. The area where these vegetable crops were grown in Serbia for the period 2012-2020 is expressed in hectares and presented in Table 2, while their percentage share is presented in Graph 2.

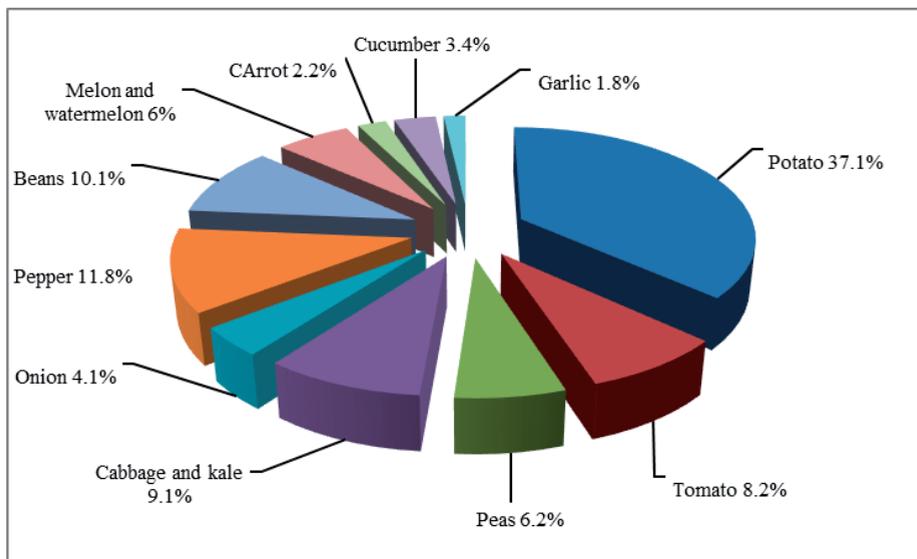
Table 2. Productive area of vegetable crops in the Republic of Serbia for the 2012-2020 period (in ha)

	Potato	Tomato	Peas	Cabbage and kale	Onion	Pepper	Beans	Melon and watermelon	Carrot	Cucumber	Garlic
2012	52,035	9,158	6,045	11,890	4,984	11,906	12,906	7,004	3,144	4,222	2,795
2013	50,740	8,723	5,526	11,246	4,674	11,714	11,931	6,800	3,059	4,048	2,799
2014	51,987	9,162	5,571	11,116	4,979	11,865	10,531	6,396	2,980	4,179	2,808
2015	41,658	8,869	9,872	11,039	5,587	14,845	12,694	6,824	2,696	3,990	1,950
2016	40,105	10,065	7,502	10,804	4,772	16,977	12,404	6,314	2,465	3,843	1,581
2017	38,472	10,917	8,097	10,213	4,145	17,386	13,181	8,372	1,932	4,271	1,820
2018	28,232	8,629	6,736	8,251	3,618	12,016	9,112	6,814	1,385	3,220	1,441
2019	34,110	7,888	6,282	7,957	3,349	10,097	9,091	5,709	1,915	3,020	1,145
2020	29,676	7,347	6,038	7,547	4,080	9,974	8,512	5,237	2,662	2,883	1,313
average	40,779	8,973	6,852	10,007	4,465	12,976	11,151	6,608	2,471	3,742	1,961
Average annual rate of change	-6.8	-2.7	0.0	-5.5	-2.5	-2.2	-5.1	-3.6	-2.1	-4.7	-9.0

Source: *The Statistical Office of the Republic of Serbia, Belgrade* <https://www.stat.gov.rs/>
<https://data.stat.gov.rs/Home/Result/130102?languageCode=sr-Cyrl&displayMode=table&guid=3786c672-5b82-4441-85cb-a1302ae75726>

The data given in Table 2 show that during the analysed 9-year period the largest average area was taken by potato (40,779 ha or 37.1%), while the smallest area was occupied by garlic (1,961 ha or 1.8%). According to the data from this table, it can be noticed that the area under sown vegetable crops decreased on average per year during the analysed period. This decrease was the most expressed in the areas cultivating garlic (-9%) and potato (-6.8%). The areas growing peas showed neither the average growth nor decrease, but they remained the same during the analysed period. The lowest average annual decrease of the sown areas was recorded for carrot (-2.1%) and pepper (-2.2%).

Graph 2. Average annual share of the most important vegetable crops in the Republic of Serbia from 2012 to 2020 (in %)



Source: The Statistical Office of the Republic of Serbia, Belgrade, <https://www.stat.gov.rs/>

The changes of the areas cultivating vegetable crops in Serbia in the analysed period were presented using selected indicators of descriptive statistics (Table 3).

Table 3. Arithmetic mean, standard deviation (in ha) and coefficient of variation (%) of the areas cultivating vegetable crops in Serbia from 2012 to 2020

Vegetable type	Arithmetic mean (ha)	Standard deviation (ha)	Coefficient of variation (%)
Potato	40,779	8,713.12	21.37
Tomato	8,973	1,003.01	11.18
Peas	6,852	1,339.33	19.55
Cabbage and kale	10,007	1,541.68	15.41
Onion	4,465	678.55	15.20
Pepper	12,976	2,606.47	20.09
Beans	11,151	1,748.33	15.68
Melon and watermelon	6,608	830.91	12.57
Carrot	2,471	569.99	23.07
Cucumber	3,742	516.20	13.79
Garlic	1,961	635.59	32.41

Source: The authors' calculation based on the SORS Belgrade data, <https://www.stat.gov.rs/>

The variations of the areas cultivating vegetable crops differ. The largest changes in the areas were registered for carrot, which is confirmed by the greatest coefficient of variation amounting to 23.07%. The smallest changes in the areas were registered for

tomato. Here the coefficient of variation amounted to 11.18%, so they had relatively more stable values of the sown areas.

Table 4 shows the average yield trends of the analysed vegetable types in the Republic of Serbia during the observed period.

Table 4. Realised yield of vegetable crops in the Republic of Serbia for the 2012-2020 period (in t/ha)

	Potato	Tomato	Peas	Cabbage and kale	Onion	Pepper	Beans	Melon and watermelon	Carrot	Cucumber	Garlic
2012	11.1	17.0	5.4	25.6	6.0	7.4	0.8	27.1	15.1	13.1	2.2
2013	15.1	20.0	5.7	27.0	6.8	8.6	1.1	37.4	21.4	15.7	2.6
2014	11.4	13.9	3.8	23.5	8.6	9.6	1.1	35.7	16.8	12.6	3.8
2015	15.3	16.6	4.5	26.2	8.2	11.1	1.0	35.4	23.7	13.2	3.6
2016	17.8	15.9	5.5	26.8	12.1	13.4	1.1	32.9	19.7	14.3	3.0
2017	15.3	15.6	4.7	25.7	8.0	11.4	1.0	29.6	16.3	13.6	2.8
2018	17.3	15.3	4.3	25.4	7.7	11.2	1.2	29.3	16.0	13.2	2.5
2019	20.6	14.2	4.1	22.4	8.8	11.7	1.0	28.6	20.6	9.8	2.7
2020	22.4	14.1	4.6	23.8	8.1	10.7	1.1	27.0	19.8	10.9	2.4
average	16.3	15.8	4.7	25.2	8.3	10.6	1.0	31.4	18.8	12.9	2.8
<i>Average annual rate of change</i>	9.2	-2.3	-2.0	-0.9	3.8	4.7	4.1	0.0	3.4	-2.3	1.1

Source: The Statistical Office of the Republic of Serbia, Belgrade, <https://www.stat.gov.rs/>
<https://data.stat.gov.rs/Home/Result/130102?languageCode=sr-Cyrl&displayMode=table&guid=6e0187fb-dbf7-456c-8dd5-e2b0fff7618b>

It can be noticed in the table above that the greatest average yield was obtained by melons and watermelons (31.4 t/ha), while the smallest yield was recorded in beans (1 t/ha) and garlic (2.8 t/ha). On the basis of the data in this table, it can be seen that during the observed period the greatest average annual increase in the total yield was registered for potato (9.2%) and pepper (4.7%). The largest average annual decrease was recorded for tomato and cucumber (-2.3%). The average annual yield of melons and watermelons remained unaltered during the observed period.

The variations in the yield of the vegetable crops are different. The greatest changes in the yield were registered in potato, which can be confirmed by the greatest coefficient of variation amounting to 21.78%. The smallest changes in the yield were determined for cabbage and kale. Here the coefficient of variation was 5.91%, so they had relatively stable yields (Table 5).

Table 5. Arithmetic mean, standard deviation (t/ha) and coefficient of variation (%) of the vegetable crop yield in Serbia from 2012 to 2020

Vegetable type	Arithmetic mean (t/ha)	Standard deviation (t/ha)	Coefficient of variation (%)
Potato	16.3	3.55	21.78
Tomato	15.8	1.80	11.39
Peas	4.7	0.62	13.19
Cabbage and kale	25.2	1.49	5.91
Onion	8.3	1.59	19.16
Pepper	10.6	1.68	15.85
Beans	1.0	0.12	12.00
Melon and watermelon	31.4	3.74	11.91
Carrot	18.8	2.74	14.57
Cucumber	12.9	1.64	12.71
Garlic	2.8	0.51	18.21

Source: The authors' calculation based on the SORS Belgrade data, <https://www.stat.gov.rs/>

In addition to the realised yield, the production results are also affected by the selling price of vegetables (Table 6).

Table 6. Selling prices of vegetables at some wholesale and green markets in Serbia for the period from December 14 to December 20, 2020

Unit of measure RSD/kg	Market	Subotica	Novi Sad	Beograd	Niš	Leskovac
Potato	Wholesale	30	-	30	35	20
	Green	-	40	80	50	20
Tomato	Wholesale	-	150	100	90	60
	Green	100	170	180	120	-
Cabbage	Wholesale	-	30	20	20	15
	Green	-	40	40	30	20
Onion	Wholesale	40	50	30	35	20
	Green	50	60	100	50	40
Pepper (except pepper Shilja and Babura)*	Wholesale	150	-	200	200	-
	Green	-	-	300	-	-
Beans white	Wholesale	300	250	230	-	-
	Green	300	300	350	-	-
Carrot	Wholesale	50	-	30	40	30
	Green	60	80	100	60	-
Cucumber for salad	Wholesale	-	100	80	90	-
	Green	-	140	150	130	-
Garlic	Wholesale	350	350	500	350	300
	Green	350	500	600	450	650

Source: [stips.minpolj.gov.rs](https://www.stips.minpolj.gov.rs) (<https://www.stips.minpolj.gov.rs/sites/default/files/2020-12/BiltenVP1751.pdf>)

*The Serbian Agricultural Market Information System (SAMIS or STIPS in Serbian) separately provides data for the prices of pepper Shilja and pepper Babura. Table 6 presents data for *pepper – other*.

The data in the Serbian Agricultural Market Information System (SAMIS) do not conform to all the vegetable types monitored by the official statistics of Serbia (SORS). Therefore, the vegetable types observed in the research period (2012-2020) are not completely adjusted to the vegetable types whose selling prices are monitored by the SAMIS database.

The vegetable prices at wholesale markets are lower by a certain percentage than the prices at green markets. In addition to the prices at the markets (wholesale or green), the prices also varied between the towns. For example, the price of tomato at the wholesale market in Belgrade amounted to 100 RSD/kg, while it was 180 RSD/kg at green markets. In Leskovac, the price of garlic at the wholesale market amounted to 300 RSD/kg, while it was 650 RSD/kg at local markets.

The vegetable demand is high in Serbia, which stimulates producers to increase their production volume. There is a significant pressure on the domestic market brought by large quantities of imported vegetables. Nevertheless, domestic users are more inclined to use domestic products. This fact is significant in terms of encouraging producers to intensify their production.

Improvement of vegetable production in the Republic of Serbia

The following measures might improve the vegetable production in our country:

- Increasing the areas where vegetables are grown, particularly increasing the areas cultivating vegetables as the subsequent crop. This would accelerate the shifts in crop rotation, ensure greater productivity and consequently increase the yield;
- Increasing the areas with greenhouses and glasshouses as protected areas with controlled production conditions;
- Creating and introducing new vegetable cultivars, primarily for fresh consumption during the whole year but also for procession, and creating new resistant cultivars and hybrids resistant to pathogens and pests. This would ensure the production of high-quality food;
- Using high-quality seeds and certified planting materials which have a significant impact on the total production, crop yield and profitability;
- The main pre-condition for profitable vegetable production is the appropriate application of irrigation, which will certainly increase the yield (Kljajić et al., 2009.);
- Improving the technology of vegetable growing by using renewable sources of energy (Jeločnik et al., 2021);
- Marketing vegetables by means of tourist demand and consumption;
- Establishing the transfer of scientific results into the direct production by educating agricultural producers at seminars, conferences, etc. (Vlahović et al., 2010; Moravčević et al., 2019.)

Conclusion

Vegetable production represents one of the most intensive branches of plant production. Among other things, it requires more work force than crop production and realises greater yield per unit area.

Although vegetable production in the Republic of Serbia is realised on a very small area (around 2.4% on average a year), under difficult conditions and mostly without irrigation, it can be claimed to have remarkable results. In the following period, further decrease of areas cultivating vegetable crops should be restricted in order to prevent the total disappearance of this important agricultural branch.

In order to increase the area and yield related to vegetable crops in the future period, the authors suggest that the Ministry of Agriculture, competent institutes, faculties, agencies and other institutions proposing agricultural policy measures should pay more attention to small-scale producers in the field of vegetable production. By allocating more incentives to these producers, vegetable production in Serbia would be improved and intensified.

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Ljubiša Milačić¹
Toplica Academy of Vocational Studies
Department of Business Vocational Studies in Blace

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Vladimir Kostić²
Academy of Technical and Vocational Studies
Department in Vranje

Srećko Milačić³
University of Priština,
Faculty of Economics – Kosovska Mitrovica

CHANGING TRENDS IN THE PUBLIC SECTOR IN THE REPUBLIC OF SERBIA⁴

Abstract

The authors deal with the problems of the public sector, which has a great share in economic growth. The public sector of Serbia is in imbalance and fundamental reforms are necessary. Given the legacy of privatization ‘through connections’, the public sector has also fallen into crisis. The sale of public companies was carried out in a non-transparent manner. Problems in the relationship between the public sector and the private sector confirm the need of restructuring the public sector.

Keywords: public sector, changes, transformation, privatization, infrastructure.

JEL classification: E66

ТРЕНДОВИ ПРОМЕНА ЈАВНОГ СЕКТОРА У СРБИЈИ

Апстракт

Аутори се баве проблемима јавног сектора који има велики удео у привредном расту. Јавни сектор државе Србије налази се у дисбалансу и неопходне су темељне реформе. С обзиром на наслеђе “бурazersке” приватизације и јавни сектор је запао у кризу. Продаја јавних предузећа обављена је нетранспарентно. Проблеми на релацији јавни сектор - приватни сектор потврђују потребу о неопходности реструктурирања јавног сектора.

Кључне речи: јавни сектор, промене, трансформација, приватизација, инфраструктура.

¹ ljubisa.milacic@vpskp.edu.rs ORCID ID 0000-0001-9062-7955

² vladakostic1985@gmail.com ORCID ID  0000-0002-0184-9802

³ srecko.kostic@pr.ac.rs ORCID ID 0000-0002-2802-4608

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Introduction

The public sector has a large share in the economic growth and development of any national economy. Without the public sector, there would be neither production of goods of national importance and nor the provision of public services. Also, there wouldn't be health and social protection, which would be at the service of citizens as well as human and material resources (local, regional and national). Thanks to them, the state apparatus runs the country, defines policy and resolves current problems, and implements long-term plans. The public sector of the Republic of Serbia is in imbalance and fundamental reforms are necessary in order to establish macroeconomic stability. The public sector is characterized by instability, especially in finance, which is why the question of transformation of the public sector arises. In order to eliminate anomalies in the public sector, it is necessary to analyze it. Without a stable public sector, we cannot count on economic growth and an increase in citizens' standards. The economy of Serbia is still in some kind of transition process, and therefore the public sector is in a gap between the norms and the European regulations that need to be adopted or have already been adopted. Instability is inherent thanks to the bureaucratic apparatus. It is too cumbersome and as such adopts and implements new regulations in an untimely manner. The size of the public sector depends on the state structure. Our state sector is still under the influence of the vestiges of socialism. After the democratic changes, the state organization begins to take on the influence of the liberal concept, which entails the reduction of the public sector and the rationalization of available resources, which is, among other things, one of the conditions for joining the EU. With the new concept came privatization, which did not bring the expected results. Our leading economists are still dealing with the place and role of the public sector in society and its rationalization. The goal of our work is to explain the role and importance of the public sector and the changes taking place within it. Then, to explain in detail the restructuring of the public sector and investments.

The volume, that is, the size of our public sector is not proportional to the realized GDP (gross domestic product). If the public sector is efficient, then there is a positive reflection on the economy which enters the stabilization phase. The public sector of Serbia shows considerable weakness and that is why strong interventions by control authorities are necessary.

Public sector restructuring and investment

Countries that have completed the reorganization and transformation of the ownership structure face many economic problems. They can be seen through the relationship between the public and private sectors. In our case, the private sector complains about the public sector and demands various corrections from the state. The meeting of the public and real economy in our country is in a chronic gap, and many legal acts and regulations will be needed which will differ from the previous ones in order to eliminate the problems. Privatization itself was announced after the October 5th changes as a saving model for failing state-owned companies (Ote, 2009, p. 19).

Economic institutes are paid with state money or money from the association, and of course, here, optimism pays off when necessary. It is evident that the results are weak

or, if there were any, they are far less than expected. The organizational structure is still in the process of reorganization.

Problems in the relationship between the state sector, the economy and the private sector are still current. The expected positive effects of the reorganization and change of ownership were absent while the anomalies of the system became even more visible. 'The thing that does not respond to what people want - or even what they need, it reacts to money' (Moore, Collins, Rosset, Esparse, 2005, p. 221). Francis Moore gave a very clear definition of what drives the system. According to him, profit, newly created value, are necessary for the results to be seen in action.

Laissez-faire, the free market and its invisible hand have become a fetish that resolves all problems. However, in reality, it turned out that this is not exactly the case. All former socialist countries started the transition process in an economic system that was not adapted to the market conditions of the economy (Milošević Šnjegota, Tomaš Miskin & Kalabić, 2017, p. 422). Big giants were sold at an extremely low price, and their stable business was either never established or it was reduced to the bare survival of former state-owned companies within the economy. In the case of privatized and restructured companies, many business improvement strategies are limited due to problems related to individual owners, control of companies by external investors, and all due to the still weak state system (Duvnjak and Stanišić, 2011, p. 289). Good examples such as the Smederevo ironworks and the mining and smelting basin Bor, which were taken over by the Chinese and are now operating successfully, are rare.

Economic publications often talk about the importance of monitoring and evaluating performance, regardless of whether it is a company or the entire country. Results are expected from politicians, managers, workers, companies... It has become common to say that it is important to monitor and evaluate performance because the public sector and the economy are oriented towards the same. Thus, there should be a matrix according to which incentives will be given to the successful, that is, depending on the performance. Measurements are also an indispensable factor - what we measure affects what we do as we collectively or individually target what we measure. The relationship between actions of implementing measures and goals is complicated; Stiglitz, Sen, Fitoussi, (2009, p. 8) express their position on the importance of comprehensive monitoring of success and rewards for achieved results. A big problem in Serbian public enterprises is certain limits. 'There are few restrictions that constrain and hinder the economy of Serbia as much as it is the case with the public enterprises. That broad economic segment, which in large part represents the ungrateful heritage of the socialist order, has spread in many directions like an insurmountable malignant tissue that deeply embeds itself in all pores not only the economy, but society as a whole.' (Majar, 2015, p. 9). Many resources available to state-owned companies remain unused. The general apathy that prevails among employees leads to an inevitable decline in activity. The newly created value is therefore smaller, so the state budget as well remains deprived of amounts that are not small. 'The logic of the functioning and organization of the public sector in the Republic of Serbia has not changed significantly over time, even though the society has gone through major changes. The logical question is, why didn't this happen?' (Veselinović, 2014, p. 3). Veselinović makes it clear to us where most of the problems come from. That's why the question arises, why don't we finally start with a comprehensive, thorough restructuring of the public sector? After the political

changes in 2000, major reforms of the economic system began, which aimed to create an open economy (Kastratović, 2016, p. 82). In May 2001, Serbia adopted a low level of privatization with all its weaknesses, which was the reason why its persistent application could not a priori provide good results by increasing the competitiveness of the Serbian economy. (Kovačević, 2010, p. 46) Privatization ‘through connections’ reigned in our region. The controls were too weak. State-owned firms were sold lightly with little or no concern for the social aspect. Tens of thousands of workers were dismissed with low severance pay or without any compensation.

In those years, we saw unpleasant scenes in the media that shook the entire public opinion, but the state institutions remained silent. The transition should have been accompanied by a package of social measures; however, this was not the case in Serbia. It is a well-known fact that in our country the transition was delayed, especially with the achieved level of development of the transition in other former socialist countries (Đorđević, Veselinović, 2010, p. 1).

The total inflow of funds from the sale of public companies was around two billion euros. The largest inflow of capital came from foreign investors. 4,338 out of a total of 4,600 state-owned enterprises were in the process of privatization as of August 1, 2006. At the auction sale, 2480 were found, and 1640 were sold, shares of 682 companies were sold, and at the tender, 66 companies were sold out of 100 companies. (Đuričin, 2006) In the last 12 years, the inflow of foreign capital has increased significantly, partly through the purchase and restructuring of failing state-owned firms and partly through the opening of new firms. ‘Thanks to the demanding economic reforms it carried out in the previous period, Serbia has positioned itself as one of the most important investment destinations in Central and Eastern Europe. The list of companies operating successfully on the Serbian market is led by Bosch, Michelin, Siemens, ZF, Panasonic, NCR, Microsoft, Gorenje, Brose, Continental, Magna, Cooper Tires, Johnson Controls, Johnson Electric, Leoni, Fiat, Chrysler Automobiles, Yazaki, Eaton, Stada, Swarovski, Aunde, Calzedonia, Mei Ta, Schneider Electric, Geox, Tarkett, Ling Long, Adient, Minth, Toyo Tires, MTU, Barry Callebaut, as well as many others’ (Development Agency of Serbia, 2022).

According to the IBM Institute for Business Value: ‘Global Location Trends 2020’ report, the Republic of Serbia is the world leader for the fourth year in a row in terms of the number of jobs created through foreign direct investment projects in 2019, and all according to the population.

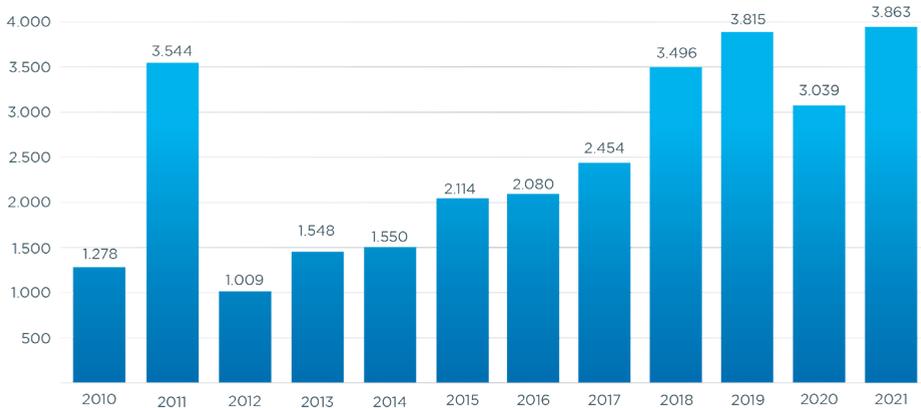
According to the criterion of the number of new jobs created (regardless of the population size) through FDI, the implementation of which began in 2019, Serbia took a high 5th place among European countries (Development Agency of Serbia, 2022).

In 2019, Serbia ranked first in the world in terms of the number of direct foreign investments. International capital flows associated with investments in companies in which a foreign investor takes a controlling stake are called direct investments (Alfaro & Chauvin, 2017, p. 5) According to the annual report published by FGI intelligence part of the British newspaper ‘*Financial Times*’. 107 greenfield projects enabled Serbia to attract 12 times more foreign direct investment than it could be expected from its economy. (Development Agency of Serbia, 2022). We can see the improvement when there are investments in existing and new companies. One of the examples is ‘*Tigar Tyres*’ company in Pirot, who, from a failed giant with dirty technologies and weak payment power has now become a serious business entity under *Michelin*. ‘*Tigar Tyres*’

in Pirot is an example of a healthy business and a company where capable workers can achieve a high personal income for our conditions.

It is obvious that investments, if they are the result of quality investment programs, bring good effects. However, there are other examples.

Inflow of foreign direct investments:



Source: National Bank of Serbia according to the Development Agency of Serbia, available at <https://ras.gov.rs/rs/podrska-investitorima/zasto-srbija/uspesne-price>

State-owned companies that successfully operate after a change of ownership are rare. Here, we specifically mean companies that were established by foreign direct investors. Their operations proved to be efficient and there was no need to reorganize the company, but the companies started working immediately. On the other hand, many problems were encountered in companies bought by foreigners. Regulations are out of date, not to mention the quality standards, technology, a workforce that was insufficiently qualified and unprepared for changes. Investors met with companies that were still operating as if they were in the era of socialism. ‘In the previous period, Serbia achieved a certain technological development primarily through the application of foreign technologies, less by developing and applying its own technologies.’ (Mitrović, 2009, p.89) ‘The key motives of foreign investments are production aimed at securing resources, securing markets, increased efficiency and acquiring strategic advantages’ (Cvetanović, Despotović, & Milanović, 2018, p. 22). We are a country rich in resources; foreign investors are satisfied with our strategic position, with the cost of labor and the developed road infrastructure as well as with the subsidies that the state provides for foreign investors.

Although we entered the process of restructuring public companies, the entire public sector, and the process of implementing new technologies took place relatively slowly. For the majority of our employees in public companies, the introduction of new programs like SAP (System Analysis Program) was perceived as difficult, and implemented inefficiently. It can be concluded from all this that where we as a country did certain things on our own, it went very badly and that without the complete takeover of our companies by foreign companies, the implementation of new ideas and knowledge takes place with a lot of difficulties.

Management of public enterprises

In Serbia, half of the employees work in state institutions such as the judiciary, police, education, healthcare, while the other half of the employees in the country is consisted of the workforce from the production sector. In most transition economies, the role of institutions and enterprises has changed over the past thirty years. 'It is known that the transition has a destructive effect on the economic structure in the short term and it is being implemented because of the long-term effects. The negative consequences of the transition in the short term are: inflation, slowing down of economic growth, decline in production (overall and especially industrial), increase in unemployment and social insecurity.' (Mitrović, 2010, p. 610) Mitrović shows us the gravity of the situation and the negative effects that follow the transition. Public enterprises preserve social peace and without their existence, no matter how inefficient the business is, the situation in countries like ours would be even more difficult. 'There is a close connection between reforms and economic success. In numerous literatures in this field, it is stated that other factors are also important: initial conditions (initial economic situation) and economic wealth, the institutional condition at the beginning of the transition as well as the political system. These factors had a direct and strong impact on the achieved gross domestic product and had a decisive influence on the selection of reforms and the extent to which countries in transition implemented them.' (Veselinović, 2020, p. 26). That is why the role of state-owned companies is of a great importance because low incomes are characteristic of countries in transition. Although there have been changes and the public sector has been changing in a transitional environment for thirty years now, the very core of the economies of these countries is made up of state-owned enterprises. In order to have a healthy economy, entrepreneurs should have a far greater participation in the creation of the new value. However, the private initiative is hampered by complicated legal procedures, i.e., there was an absence of the 'rule of law'. Positions on the market were taken by foreign companies instead of domestic entrepreneurs. It must be reluctantly admitted that the import lobby and the foreign factor are too strong for small businessmen to resist. Until the emergence of covid in Serbia, economic growth had strong dynamics. However, the inability to perform part of the activity left consequences. Foreign direct investments regulated the negative effects of the external imbalance as much as it was possible. However, it was necessary to take measures to reduce the budget deficit. One of the ways is through proper management of the fiscal policy. The process of public sector restructuring is generally accompanied by fluctuations. Fluctuations can be controlled only by proper management of an efficient economic policy; in our case, it is possible by conducting an expansive fiscal and monetary policy. In crisis periods, increasing infrastructure spending in the short term can boost economic activity in crisis periods. So far, it has been shown many times that the construction industry is able to be the engine of the economy and the driver of other economic branches and thus help to eliminate the negative effects of the crisis caused by rigid changes within the public sector.

When the government of a country that is undergoing restructuring leads an economic policy with visible effects, then companies adapt more quickly to the positive effects of the reforms. However, if the reforms did not have positive effects, the adjustment would be slower. (Adjémian, Cahn & Maggiar, 2008, p. 228)

On the other hand, although the state is working to improve the economic situation, there is a problem of labor migration abroad. Foreign investors are forced to look for workers in the countries around us. Here is the most important part of the problem. Unemployment is decreasing, but the main reason for its decrease is migration. On the other hand, non-productivity, the low level of profits created by public companies occur due to state interventionism and non-financial company goals. The government and local self-governments are often forced to allocate fresh liquidity from the budget and 'pump' money into state-owned companies that do not function well enough in the market economy. The provision of subsidies is particularly emphasized in regions where the economic environment is unfavorable and there is general depreciation. Many things can be learned from the EU. Its prominent members can be a benchmark for leading state-owned companies on the right path. The Republic of Serbia, as a country that aspires to join the European Union, should improve its indicators and continue with harmonization of standards with the EU because this is the only way to effectively complete the process of transition, which it entered late. (Veselinović, 2019, p. 76)

Conclusion

In this research, the authors deal with the public sector in the Republic of Serbia and the changes that have been going on for a long time. They point to the need for fundamental reform in order to establish macroeconomic stability. They propose the rationalization of available human resources. They explained in detail the consequences of privatization that did not bring the expected results. Aware that there is no economic growth without a stable public sector, they raise the issue of public sector transformation. The public sector in the Republic of Serbia is low-productive and inefficient, set up irrationally. This research paper analyzes the situation in the public sector with an emphasis on the creation of real reasons for its foundation. Creating a favorable environment for successful economic development is not possible without rationalization, significant reorganization and restructuring of public enterprises. However, countries that completed the organizational transformation of their organizational structure a long time ago still face economic problems. In our case, it is the private sector that complains about the work of the public sector. The meeting of the public and real economy in our country is in a chronic gap. However, even though the society was going through great changes, the question arises, why not finally start with a comprehensive, thorough restructuring of the public sector? We have listed the total inflow of funds from the sale of public companies as well as the number of sold companies in the process of privatization. The rule of law is a necessity without which it is not possible to solve the problem of the public sector. Fluctuations can be controlled only by proper management of efficient fiscal and monetary policy. The government and local self-governments are often forced to allocate money from the budget for better liquidity, which is not easy to deal with.

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Lidija Madžar¹
Alfa BK University, Belgrade
Faculty of Finance, Banking and Auditing

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Dušica Karić²
Borjana Mirjanić³
Business and Arts Academy of Applied Studies, Belgrade

MODELLING THE VOLATILITY OF THE GLOBAL GOLD PRICE BY APPLYING THE ARCH/GARCH MODELS

Abstract

The purpose of this article is to analyse the trend of global gold price yields and volatility with the aim of making effective financial decisions about investments in this precious metal, by applying and comparing the results of ARCH and GARCH competing models, using the lowest values of the chosen information criteria. ARCH and GARCH models are intended for the time series' analysis, with the observed instability of the conditional variance. Gold usually has the function of a safe haven, also serving as a warrantor of monetary stability, especially in times of crisis. On the example of 1,151 daily observations on the gold global price and yield rates, the E-GARCH model was applied, the results of which suggest investors to be cautious in their decision-making since the impact of negative shocks (losses) on yield volatility has a strong long-memory effect, making this investments highly risky, especially in bad economic circumstances.

Key words: gold, volatility, heteroscedasticity, ARCH/GARCH models, safe haven, uncertainty.

JEL classification: C22, C52, G11, G15

МОДЕЛИРАЊЕ ВОЛАТИЛНОСТИ ГЛОБАЛНЕ ЦЕНЕ ЗЛАТА ПРИМЕНОМ ARCH/GARCH МОДЕЛА

Апстракт

Сврха овог рада је да изврши анализу тренда приноса и волатилности глобалне цене злата са циљем доношења ефективних финансијских одлука о улагањима у овај драгоцени метал, применом и поређењем резултата ARCH и GARCH конкурентних модела, коришћењем најнижих вредности уобичајених информационих критеријума. Модели ауторегресионе условне хетероскедастичности (ARCH модели) и уопштене ауторегресионе условне хетероскедастичности (GARCH модели) су намењени анализи временских

¹ lidi.madzar@gmail.com, ORCID ID 0000-0002-1708-5683

² prof.dusica@gmail.com, ORCID ID 0000-0002-8796-1562

³ borjana.mirjanic@gmail.com, ORCID ID 0000-0002-9260-130X

серија у којима се уочава нестабилност условне варијансе. При томе, злато обично има функцију сигурног прибежишта, а служи и као гарант монетарне стабилности, посебно у временима кризе. На примеру од 1.151 дневних опсервација о глобалној цени и стопама приноса злата, одабран је и примењен је E-GARCH модел чији резултати сугеришу инвеститорима да буду опрезни у одлучивању јер утицај негативних шокова (зубитака) на волатилност приноса има снажан ефекат дуге меморије, чинећи и ова улагања високо ризичним, посебно у лошим економским околностима.

Кључне речи: злато, волатилност, хетероскедастичност, ARCH/GARCH модели, сигурно прибежиште, неизвесност.

Introduction and Theoretical Background

Global economic shocks such as financial and economic crisis, geostrategic turmoil, wars, environmental problems and climate change, and more recently the current pandemics and other global health issues faced many economic sectors with pronounced and challenging obstacles. One of them is the global financial sector, as a combination of the world markets of securities, money and gold, which reacted to recent global shocks in various ways in diverse parts of the world. In addition, the global commodity sector also experienced unique and so far unprecedented reactions to current global turbulences, stimulated by governmental fiscal and monetary policy measures, cautious behaviour of investors and consumers, anti-crisis regulations of central banks, as well as by general welfare policy measures. Unlike the global financial market, on which these adverse shocks have led to general uncertainty, mistrust and reduced investment, the global commodity market has seen a rapid rise in commodity prices, with the exception of the gold price that has recently experienced a stagnant and/or declining trend in short run (Sheth, Sushra, Kshirsagar, & Shah, 2022).

In the times of financial crises, the threat to the entire financial system and of defaults on debts, there is also a crisis in the functioning of financial institutions, which usually spreads from one to the other ones through the *domino effect*. In such circumstances, serious consequences usually occur, such as failures of paying liabilities, financial institutions' bankruptcy waves, reduced liquidity due to reduced credit transfers, decreased money supply, reduced confidence in financial assets, and naturally negative effects on the economy itself. Therefore, it is more important than ever to explore ways in which investors could protect themselves from the risk of a possible financial market crash (Roskopf, & Rutersten, 2020, p. 2). In such circumstances, investors themselves are obliged to change the structure of their financial portfolios, from shares and other securities to safer forms of investment such as gold. Therefore, determining the transmission channels of shocks and volatility from one market to another is an important issue for all market participants (Gencer, & Musoglu, 2014, p. 88). In such conditions, gold is usually perceived as the *last land of resort* and the safest form of investment, especially in times of crises and economic uncertainty. As a result, there is usually a marked increase in demand for gold. Gold still represents the most efficient form of commodity investment since it has retained certain attributes that set it apart

from other types of commodities. It is also perceived as a special, differentiated type of asset because it brings above-average returns in various time frames, playing the role of the store of value and unique diversifier in asset protection. At the same time, it is also characterized by lower price volatility and high liquidity. Therefore, even during the pandemic year 2021, the weight of gold in commodity indices gradually increased, while its price volatility remained stable, despite the stocks, bonds and other assets' price instability (World Gold Council, 2021, p. 1).

Due to its favourable physical and chemical properties, durability and relative rarity, gold has taken a special place in the international commodity exchange and figures as a unique measure of value. In addition to its market functions, gold also serves to ensure the international liquidity of contemporary countries and represents an indispensable part of their monetary reserves. The gold reserves ensure the external stability of currencies and maintaining the liquidity of countries, while these functions are usually achieved through its sale on the international gold market, either through auctions, classical sales or through its pledge to international financial institutions with the aim of obtaining loans (Jakšić, 2006, pp. 897-898). Gold reserves secure the stability of the monetary system, while its stability stems from the fact that, unlike paper money, it cannot be printed in unlimited quantities. Its value also cannot be affected by various movements such as changes in interest rates, changes in prices of securities and other turbulences in the financial and commodity markets (Božić, 2019). From the point of view of the central bank as an institutional investor, gold usually serves as a form of protection against inflation effects in the long term, while in the structure of foreign exchange reserves it reduces the risk of interest rates and contributes to preserving the value of investments (Brakočević, 2022). Apart from monetary functions, gold also serves as a means of private accumulation of wealth in conditions of currency, financial and general economic instability.

Many studies indicate that gold has a function of *safe haven* that protects investors from various risks in times of financial crisis. In that case, gold occurs as a form of property that protects them from sudden changes in securities' prices and bond yields, but at the same time, it is not endangered by the eventual market crash. Investigating constant and time-varying relationships among returns on stocks, bonds and gold in the United States (US), Great Britain and Germany, Dirk G. Baur and Brian M. Lucey (2009) concluded that gold represents a hedge and a *safe haven* in extreme stock market conditions, within a short period of up to 15 trading days. This function of gold generally affects the stability and resilience of financial markets since it reduces the risks and losses of investors in the short term, in times of general uncertainty. However, they conclude that unlike investing in stocks and other securities, gold is still not a good alternative to safer bond investments. At the same time, investors usually buy gold on days of extremely negative returns, while selling it in the market after the volatility has decreased and its price has stabilized.

Juan C. Reboredo (2013, p. 2665) also found a positive, statistically significant and symmetric interdependence between gold and the depreciation of US dollar, indicating that gold can act as a hedge against the US dollar exchange rate volatility, but also as an effective and safe resort for all investors. In addition, its utility in investment portfolios is reflected in the advantages of asset diversification and reduction of investment risk. However, unlike previous research, there are also opposite findings (Coudert, & Raymond,

2010, p. 4) that analysed the relationship among the price of gold, the price of shares and the main stock market indices in the G7 countries. They state that in the short term, during periods of recession, there is no correlation between the price of gold and stocks, which may qualify it as a *weak safe haven*. On the other hand, in the somewhat longer term, negative relationships between the price of gold and some stock market indicators are visible, which does not allow for the construction of a fully protected portfolio that would be resistant to all financial and economic crises. It further points to the riskiness of investing in gold, even during the period of crises. Finally, there are also studies that point to certain disadvantages of gold in the role of investment commodity. First, its real intrinsic value is difficult to estimate given the fact that the market price of gold is generally not determined by its use value. Second, gold, unlike classic securities such as stocks and bonds, does not have the ability to pay out concrete returns. Thirdly, gold is also characterized by relative inelasticity of supply because its research, discoveries and extracting is a time consuming processes. Fourth, the demand for gold is countercyclical, which all points to its role as a reliable store of value, even in times of crisis and general uncertainty (Roskopf, & Rutersten, 2020, p. 3).

The World Bank states that after the emergence of the Ukrainian crisis, in the first quarter of 2022 there was a growth of its Precious Metals Index by 4% due to the growth of global inflation, the increase in investment demand and the increased desire of market participants towards safe investments. In the same period, the global price of gold increased by 4.3%, along with the growth of inflation, nominal interest rates and persistent geopolitical tensions. However, from the beginning of the second quarter, gold prices and yields began to decrease, affecting the reduction of investment flows as a key driver of the price of this precious metal. The War in Ukraine undoubtedly affected the global gold market, considering that Russia is the world's second largest producer and exporter of this metal, accounting for about 10% of its global product. At the same time, Russia is also one of the world's largest buyers of gold, which is supported by the fact that the Central Bank of Russia has not stopped buying it from domestic producers with the aim of increasing its monetary reserves. The World Bank expects a further modest increase in the price of gold during 2022, as well as its decline during the next year, 2023, by as much as 10% due to the expected measures of stricter monetary policy in developed countries and a further increase in interest rates (World Bank, 2022, p. 47). Finally, in its latest report the World Gold Council states that unlike the volatility of various forms of assets and goods, during 2020, as the year of great health uncertainties, gold still maintained its price stability. This stems from its role of a unique asset diversifier in turbulent and uncertain markets, its economic importance and liquidity, as well as the volatility and vulnerability of other commodities such as silver, copper, platinum and other metals, livestock, timber and crude oil (World Gold Council, 2021, pp. 2-3).

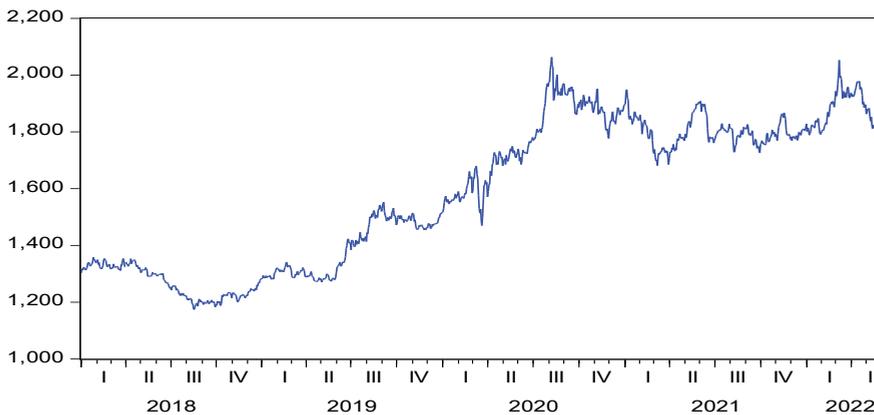
The purpose of this paper is to analyse the trend of the gold yields and price volatility with the aim of making effective financial decisions about investments in this precious metal, by applying and comparing the results of Autoregressive Conditional Heteroscedasticity (ARCH) and the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) competing models, using the lowest values of chosen information criteria. The article starts from the null hypothesis that gold represents an efficient *safe haven* for all investors, especially in times of economic turbulence and general uncertainty. The next part of the article refers to the description of the data

used and the research methodology, followed by a section on the discussion of the results obtained by testing different ARCH/GARCH models and the evaluation of the proposed specification. The fifth part of the article is devoted to the evaluation of the statistical quality of the proposed E-GARCH(1,1) model with GED (Generalized Error) distribution, while its last part summarizes the presented research results and gives specific recommendations to global investors.

Data, Research Design and Methodology

In the conducted research, we used a closing price of gold since it reflects all buying and selling activities during one trading day. We collected daily data on gold prices per ounce in US dollars from the Internet portal *Investing.com*. The research covered the period from December 30 2017 to June 1 2022, which makes a total of 1,151 daily gold price observations and 1,150 daily yield/loss rates. Statistical and econometric data processing was carried out using EViews8 software (Copyright © 1994–2013 IHS Global Inc.). Quantitative modelling of yield oscillations was conducted using ARCH and three variants of GARCH competing models (two of which are asymmetric GARCH models: T-GARCH and E-GARCH). Figure 1 indicates the trend of the gold price expressed in US dollars in the observed period.

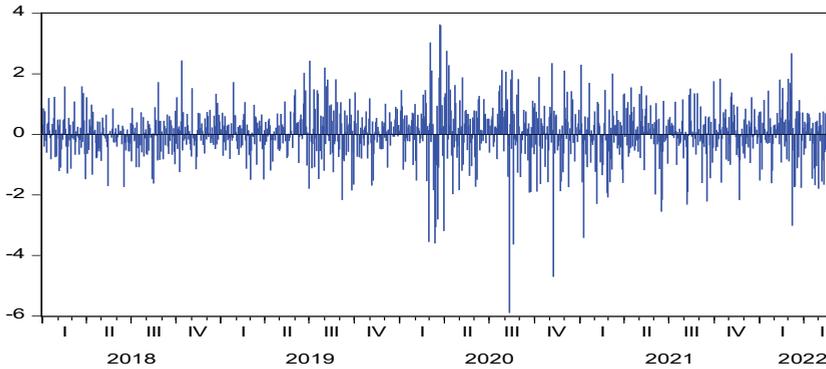
Figure 1: Trend of the gold price in US dollars in the observed period



Source: authors' calculation

Testing the stationarity of the time series was carried out using the Augmented Dickey-Fuller (ADF) test, while its non-stationarity was removed by transforming the data by differentiating of the first order of their logarithmic values. An increase in the price of gold represents a capital gain, while its decrease is a capital loss. After this step, the testing of the hypothesis about the normal distribution of the empirical data of the thus obtained stationary variable was approached.

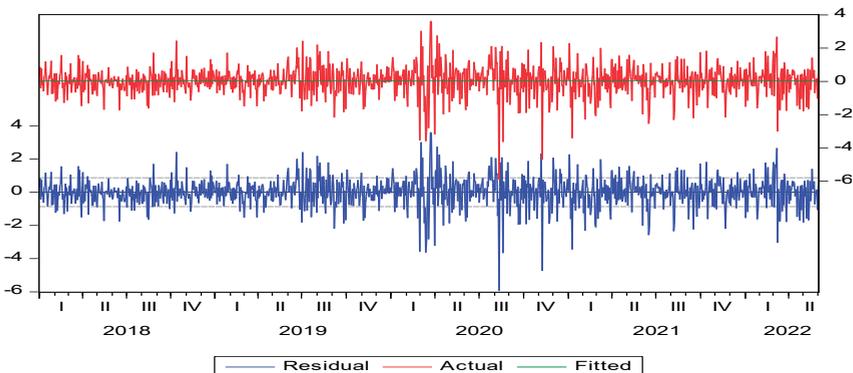
Figure 2: Trend of the logarithmic value of the gold return/loss in the observed period



Source: authors' calculation

Figure 2 clearly shows the high oscillations in the trend of the daily gold yield rate, while the presence of a large number of extremely positive and extremely negative values was observed, which made it necessary to test the hypothesis about the presence of a normal distribution in the empirical data distribution. Excess kurtosis coefficient (leptokurtosis) explains the observed extreme values from Figure 2. Testing for a normal distribution was carried out using the Jarque-Bera test, based on which we rejected the null hypothesis about the existence of a normal distribution and accepted the alternative hypothesis that the time series of the gold yield rate was not normally distributed. In addition, the constructed Q-Q plot confirmed the deviation of the empirical values from the normal Gaussian distribution, with the conclusion that the presence of extreme values is conditioned by the observed leptokurtosis. After this step, the classical ordinary least squares (OLS) regression was performed to test the clustering of volatility in the residuals, that is, to confirm the presence of their heteroscedasticity.

Figure 3: Residual trend of logarithmic values of gold return/loss in the observed period



Source: authors' calculation

Figure 3 confirms the presence of volatility clusters, i.e. time-varying volatility (heteroscedasticity), when the volatility of the time series is grouped in time. Small

volatility fluctuations are often followed by periods of low fluctuations, while periods of large volatility fluctuations are often followed by periods of high fluctuations. The applied test confirmed the presence of the ARCH effect, as well as the observable volatility clusters. Therefore, the statistical and graphical confirmation of the presence of heteroscedasticity justified the need for testing of this problem with some of the models from the ARCH family.

E-GARCH(1,1) Model

Nelson (1991, pp. 347-370) presented the exponential or E-GARCH model that allows for asymmetric shocks in volatility. More specifically, he proposed the E-GARCH model with the aim of overcoming the GARCH model shortcomings in handling of financial time series, and especially with the goal of acknowledging and enabling asymmetric effects among positive and negative financial instrument returns. Nelson extended the standard GARCH model by integrating the leverage term, when negative past shocks have a greater impact on future volatility than positive past shocks of the same intensity. In that manner, the asymmetric E-GARCH (1,1) model provides evidence of a leverage effect.

Due to the mentioned asymmetry, the model includes the leverage effect, which is usually interpreted as a negative correlation between negative returns on lag and volatility. Empirical analyses of the leverage effect encouraged the development of a model with asymmetric volatility, which arises due to positive and negative shocks. The leverage effect was first noticed by Black (1976, pp. 177-181), and it is best shown by the news impact curve, which was later analysed in more detail by Pagan and Schwert (1990, pp. 267-290). This curve shows how future volatility reacts to good or poor news – in asymmetric GARCH models, the curve appears to be asymmetric. This leads to negative shocks that affect volatility more strongly than positive ones of the same strength (Engle, & Ng, 1993, pp. 1749-1778). It has also been empirically established that the error distribution affects the estimate of the asymmetry parameter γ , but that it is not the case with the volatility of the other parameters (Rodríguez, & Ruiz, 2012, p. 661). This model can be represented by the following mathematical expression:

$$\text{E-GARCH}(1,1): \log(\sigma_t^2) = \omega + \beta \log(\sigma_{t-1}^2) + \gamma \frac{\varepsilon_{t-1}}{\sqrt{\sigma_{t-1}^2}} + \alpha \left[\frac{|\varepsilon_{t-1}|}{\sqrt{\sigma_{t-1}^2}} - \sqrt{\frac{2}{\pi}} \right] \quad (1)$$

where

σ_t^2 is the conditional standard deviation, i.e. the volatility at time t ,

ω is the constant term being evaluated,

β is the parameter of the GARCH component model,

α is the parameter of the ARCH component model,

$[e_t]$ are the standardized residuals: $[e_t] \sim \text{i.i.d.}$; $E[e_t]=0$ and $\text{VAR}[e_t]=1$, while

γ is the leverage coefficient, i.e. the asymmetric component of the model.

The coefficients ω , α and β of the conditional variability equation must satisfy the following requests: $\alpha + \beta < 1$, as well as $\omega > 0$, $\alpha \geq 0$ and $\beta \geq 0$. These requests ensure the firmness of the unconditional variance.

The parameter γ measures the asymmetry of leverage effect, so the E-GARCH model allows testing for asymmetry. When $\gamma = 0$, the model is symmetric, that is, positive and negative shocks affect the volatility of the series of asset returns in an equal way. If the leverage coefficient is negative ($\gamma < 0$), than positive (affirmative) news from the market creates less volatility than negative shocks. On the other hand, if the leverage coefficient is positive ($\gamma > 0$), than positive shocks have a greater impact than the negative ones. At the same time, the direction of the yields' change also influences volatility. The sum of parameters α and γ shows the effect of positive shocks on the series of asset returns. In the case of negative value of leverage coefficient γ , this sum will be less than the value of α , and vice versa, if the value of γ is positive, this sum will be higher than the value of parameter α (Kovačević, 2016, pp. 26-30).

Testing for Different ARCH/GARCH Models and Evaluation of the Proposed Specification

Using the lowest value of criteria such as AIC (Akaike information criterion), SIC (Schwartz information criterion) and HQC (Hannan–Quinn information criterion) (Table 1), E-GARCH(1,1) model with the Generalized error (GED) distribution was selected as the optimal model with the lowest values of the mentioned information criteria.

Table 1: Information criteria of different ARCH/GARCH models with different distributions obtained by EViews software

	ARCH	GARCH(1,1)	T-GARCH	E-GARCH(1,1)
Distribution: Normal Gauss distribution				
AIC	2.454620	2.440517	2.428690	2.429448
SIC	2.485344	2.458074	2.450636	2.451393
HQC	2.466218	2.447144	2.436975	2.437732
Distribution: Student's t distribution				
AIC	2.392737	2.369304	2.364119	2.365596
SIC	2.427850	2.391249	2.390454	2.391931
HQC	2.405991	2.377588	2.374060	2.375537
Distribution: GED – Generalized Error				
AIC	2.385924	2.367477	2.363024	2.362086
SIC	2.421037	2.389422	2.389359	2.388421
HQC	2.399178	2.375761	2.380965	2.372027
Distribution: Student's with fixed df				
AIC	2.406552	2.382837	2.376763	2.378109
SIC	2.437276	2.400394	2.398709	2.400055
HQC	2.418150	2.389465	2.385047	2.386393
Distribution: GED with fixed parameter				
AIC	2.397482	2.379308	2.371065	2.372070
SIC	2.428206	2.396864	2.393011	2.394016
HQC	2.409079	2.385935	2.379349	2.380354

Source: authors' calculation

After this step, the authors approached to the parameterization of the chosen E-GARCH(1,1)-GED model. When estimating the parameters to maximize the likelihood function, 18 iterations were required for the process to converge. The value of coefficient C(4) ($C(4) = -0.050626$), that indicated the existence of a Leverage effect, was negative and statistically significant ($p = 0.0094 < 0.05$). When the Leverage effect is negative, there is a correlation between past returns and future return volatility. In other words, a decrease in yields leads to an increase in volatility. Positive shocks have a smaller impact on the conditional variance than negative news or shocks. Good news, positive shocks or errors generate less volatility (variance) than bad news (for example, a decrease in GDP, inflation, unemployment, pessimistic forecasts, etc.).

Evaluation of the Statistical Quality of the Proposed Model

Testing for the statistical quality of the proposed model was performed by testing heteroscedasticity, serial correlation and normal distribution of residuals.

Table 2: Heteroscedasticity test results of the residuals of the proposed E-GARCH(1,1) model with GED distribution, obtained by EViews software

F-statistic	0.131672	Prob. F(1,1147)	0.7168
Obs*R-squared	0.131887	Prob. Chi-Square(1)	0.7165

Source: authors' calculation

The value of Prob. Chi-Square(1) was 0.7165 and was greater than 5%, so the H_0 that there was no ARCH effect in the residuals of the proposed model was accepted.

The conducted analysis of the ordinary and partial correlogram (AC and PAC) of the residuals showed that p-values of the Q-statistics on all lags were greater than 5%, based on which the H_0 that there was no autocorrelation in the residuals of the model was accepted. Based on the received estimates of this coefficient, we conclude that the residuals did not have an autoregressive structure of variability, that is, that there was no serial correlation in the residuals. The value of the Ljung-Box Q-statistics (Ljung, & Box, 1979, pp. 265-270) for the order of the correlation coefficient of 30 shown on the correlogram was 18.890, with a value of Prob* ($p = 0.942$), which was greater than 5%, as a result of which the null hypothesis that in the residuals of the observed time series was no serial autocorrelation was accepted. The tabular value of the Ljung-Box Q-test for the order of the correlation coefficient of 30 amounted to $\chi^2_{30,0.05} = 43.773$ and it was higher than the obtained value (18,890). Based on mentioned results of the conducted Q-test, we concluded that the null hypothesis that in the model time series of residuals there was no autocorrelation of order 30 could not be rejected.

Testing the hypothesis about the normal distribution of the residuals of the proposed model was performed using the Jarque-Bera statistical test. The value of JB statistics was 199.0835, while its p-value of $p = 0.0000$ was less than 5%, which is why the null hypothesis was rejected and the H_1 that the residuals of the model were not normally distributed was accepted.

The absence of heteroscedasticity and serial correlation of model residuals constitute two of the three statistical quality requirements of the proposed model. The only shortcoming of the model that prevents the conclusion that the model is completely statistically valid and qualitative is the absence of a normal distribution of residuals. The obtained results nevertheless point to the conclusion that the model can be accepted as valid and applicable when modelling the trend of the dependent variable, because it fulfils two of the three criteria of statistical quality.

Concluding Remarks

The paper confirmed the presence of variation in the conditional variance of the gold price returns' time series in the world market. It was determined that volatilities are not constant over time, and that the analysed time series has the property of heteroscedasticity, that is, it possesses time-varying volatility that contributes to the excess kurtosis of the yield distribution (leptokurtosis of the empirical distribution). Investors are exposed to the risk of the gold price volatility on the world market, and they must integrate the observed instability of the variance into models that require the assessment of the dynamics of the variance by using models from the ARCH/GARCH family.

By quantitatively modelling gold yields' volatility using ARCH and three variants of GARCH models with different distributions (two of which are asymmetric GARCH models: T-GARCH and E-GARCH(1,1)), and based on three information criteria, E-GARCH(1,1)-GED model was chosen as the optimal one since it realized the lowest information criteria values. The model is statistically valid and as such applicable when modelling the volatility of the price of gold on the world market. In addition, the proposed asymmetric E-GARCH(1,1)-GED model confirms the assumption that the impact of negative shocks (losses) is stronger than the impact of positive shocks (returns), and includes the Leverage effect in situations when negative information (losses) condition higher volatility in the following time interval in relation to positive information (yields).

In accordance with the obtained results, investors are recommended to act with special caution when making investment decisions, because the impact of negative shocks (losses) on yield volatility has a strong long-memory effect. Based on the obtained results, it can be said that due to the observed asymmetric volatility of gold yields, gold can rather be considered highly risky, especially in bad economic circumstances, than a *safe* alternative investment destination. Accordingly, based on the research results, we can reject the initial hypothesis that gold represents an efficient and safe investment alternative, especially in times of economic instability. Therefore, consideration of some other, less volatile and more reliable forms of investment could be the subject of further empirical research.

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Nedeljko Prdić¹
JKP Tržnica, Novi Sad

Boris Kuzman²
Institute of Agricultural Economics, Belgrade

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INNOVATIONS AND IMPACT ON MARKET COMPETITIVENESS BASED ON MARKETING RESEARCH

Abstract

The aim of this paper is to define development and competitiveness strategy of marketplaces using innovations and service provision, on the bases of theoretical attitudes analysis and research results. Performed researches are based on implementation of special methods of cognition and marketing research. Research results show that marketplaces are very efficient instrument of achieving economic and communications aims. It is established that salesmen on marketplaces by conducting concrete and precise strategies of marketing communications, may achieve their aims in relations to competition and in purpose of costumers' satisfaction. Presented researches make solid foundation for investments by market places through innovations in business, and that increase competitiveness of marketplaces. This research is considered a good start in that direction. The conclusion is that informatics achievements development and technology implementation create possibility to control volume of scales and increase compliance of marketplaces based on respect of customers' attitudes.

Keywords: marketing research, innovations, investments, competitiveness, marketplaces

JEL Classification: M31, M21

ИНОВАЦИЈЕ И УТИЦАЈ НА КОНКУРЕНТНОСТ ПИЈАЦА НА ОСНОВУ МАРКЕТИНШКИХ ИСТРАЖИВАЊА

Апстракт

Циљ овог рада је да на основу анализе теоријских ставова и резултата истраживања дефинише стратегију развоја и конкурентности пијаца на основу иновација и пружања услуга. Извршена истраживања заснивају се на примени посебних метода сазнања и маркетиншких истраживања. Резултати истраживања показују да су пијаце врло ефикасан инструмент за постизање економских и комуникационих циљева на тржишту. Третирањем понуде производа као улагања кроз утицај на интерес потрошача, могуће је утицати на куповину до одређеног нивоа. Утврђено је да продајци на

¹ nedeljko.prdic021@gmail.com, ORCID ID 0000-0003-3199-1188

² kuzman.boris@yahoo.com, ORCID ID 0000-0002-8661-2993

пијацама спровођењем конкретних и прецизних стратегија маркетиншке комуникације могу постићи своје циљеве у односу на конкуренцију и у сврху задовољства купаца. Презентована истраживања чине солидну основу за улагања на пијацама кроз иновације у пословању, а то повећава конкурентност на тржишту. Потребно је потврдити одређена истраживања помоћу неких научних и емпиријских истраживања. Ово истраживање се сматра добрим почетком у том правцу. Закључак је да развој информатичких достигнућа и примена технологије стварају могућност контроле обима вага и повећавају усклађеност пијаца на основу поштовања ставова купаца.

Кључне речи: *маркетиншка истраживања, иновације, инвестиције конкурентност, пијаце*

Introduction

Services are a significant sector of economic activity and a special category of study in marketing. Marketing as a special scientific field that studies services also includes marketing communication. With the help of marketing communications, the company that provides services gives different messages about itself and the services it offers. In our example, the service providers are public utility companies that provide services in the marketplaces. The company providing services that is considered in this paper research provides messages that are primarily aimed at three groups of the public. The first recipients of the messages are the tenants of business and marketplace space as direct users. The second group of message recipients consists of customers and consumers in the marketplaces, while the third group consists of competing companies and the rest of the public. The most important segment of the research emphasises the importance of innovations that will increase the competitiveness of marketplaces and modernise services to sellers. The investment in modern technologies will increase the control of traffic in the marketplace, but also the possibility of greater renting of business space. Investments that can increase competitiveness relate to the application of modern technologies and the maintenance and storage of products. The problem of researching this paper is to emphasise the importance of marketing and marketing communications in service companies with special emphasis on marketplaces because of their historical, public and market importance.

The importance of marketing communications undertaken by sellers in the marketplace is especially emphasised, all with the aim of improving communication that will be reflected in increased sales. The intention is twofold, in the theoretical part it wants to form a conceptual model of marketing communication based on the interests and connections of companies and employees of service providers, sellers, customers and consumers as well as other interested public. When designing the model of marketing communication, we start from the existing models of market communication, literature and set empirical reviews. The empirical part seeks to find a connection between the provision of modern services through the application of innovations and modern technologies and the business success of vendors in the market. To this end, we investigated how the effects on salespeople are achieved by applying precise marketing

communication strategies. Based on the conducted research, a general conceptual model of marketing communication based on investments and innovations of service provider companies has been defined, which is reflected in increased sales of sellers based on the interests of buyers and consumers.

Developing a strategic model of global market selection implies implementing segmentation in the original sense of the word. The segmentation of the global market should, therefore, be in the function of directed marketing, with the aim of isolating the most business-interesting parts of this market. (Grubor, 2012).

If we look at markets as strategic institutions for supplying the population with fresh agricultural products at the world level, they have a global character. However, those at the level of individual countries retain their specifics, but they have the same goal everywhere. Agriculture as a complementary activity represents a particular potential for the growth of the surrounding rural areas and the improvement of the living standard of the domicile population. (Milićević et al., 2022). Nevertheless, at the global level, we can view them as separate market segments with a strong targeted marketing function related to specific market segments.

It is imperative for companies to focus on integrated marketing communications because of the wide range of means of communication, message and targeted consumers that retailers have in mind. Marketers need to look at consumers from all aspects to fully understand all the possible differences in what communication can take advantage of their behaviour. (Prasad et al., 2003).

If we look at markets as public companies, primary integrated marketing communications require an optimal level that “integrates” the interests of the market, sales and consumers. The integration of these interests into the future enables markets to have an efficient and interactive relationship with consumers. Simply put, mass communications are not the goal of market promotion, so interactive, personal communications, publicity, and the living word are the most effective means of achieving integrated market marketing service activities.

Based on the conducted research, the importance of the market as an instrument of trade on the global market is emphasised, which by applying innovations can gain an advantage in each individual market of a certain country. When it comes to the risk of an investment project, it is reduced to a minimum in the case of marketplaces, because traffic control and the overall efficiency of modern markets can be predicted with certainty.

Research methods and assumptions

Modern market business in the field of marketplaces is placed within the framework of finding their efficiency. The subject of the research is based on previously defined goals and control of the achieved effects. The research is based on the application of a comparative method of marketing research using the historical and marketing research method. Literature in the field of marketing and management as well as special literature related to specialised market institutions (marketplaces) were used for the analysis through the historical method. The relevance of the historical method is based on the theoretical and experiential knowledge of the author. The survey questionnaire was used in marketing research. Among the special methods of cognition, the methods

of statistical data processing, analysis and synthesis, as well as the methods of logical reasoning were used. Based on clearly defined goals of methods and instruments, the research assumptions are determined:

H1: The application of innovations in the marketplace business will result in economic effects in the form of increased revenues

H2: Potential customers who have visited the point of sale will have more immediate knowledge of the product than those who have not visited the point of sale

H3: Based on product communication knowledge, customers who have visited the point of sale will be more interested in the product than those who have not visited the point of sale.

Marketing research in the function of applying innovations in the market

Marketing research is the information base for making business decisions. The importance of marketing researched in this paper stems from the need to collect, process and analyse data that may be relevant to the realisation of the planned marketplace competitiveness strategy in the market. The initial model of communication applies to marketplaces as well as to sellers and buyers in the marketplace. From the aspect of marketplaces, the variables that are important for research refer to the application of innovations by which the service provider company achieves greater control of turnover in business.

In order to harmonize the values of the parameters, it is necessary to improve the service method, choose the optimal way of communication and change the whole range of similar parameters. (Prdić, 2017).

If we look at the problem of marketplaces at the global level of market research, we notice the diversity of ideas in the functioning of marketplaces depending on the historical and marketplace significance for a particular country. Namely, markets can be viewed as global institutions, not as large companies that generate income worldwide, but as institutions without which it is not possible to trade in a particular market of agricultural products. With ideas and innovations in service delivery and traffic control, we actually valorise our own knowledge by investing in innovation. The profit made by ideas and innovations in the age of the information age and the application of the Internet is a real form of gaining a competitive advantage.

The application of innovative technologies in the functioning of marketplaces means the improvement of existing and the application of new payment methods, new equipment and communication. Through these innovations, employees in the marketplaces transfer knowledge and increase the company's performance with the quality of service provided. New technologies, in addition to economic effects, give employees the opportunity to realise their knowledge and skills by doing so on the principles of social marketing. The different interests of marketplaces, sellers and buyers form a "network" of purposeful adaptation to new conditions, resources and knowledge. Thus, the primary goal of market marketing is reflected in investments that can be used to achieve the interests of consumers by applying innovations in business as the basis of competitive advantage.

Research results

When defining the mission (purpose) of marketplaces as service market institutions, it is necessary to define goals and plans for their realization. The purpose of the markets stems from their market position, which serves to supply consumers with fresh agricultural and food products. The purpose of planning marketing activities is to objectively assess the market opportunities of the marketplace. It enables an objective view of the possibilities and situation in the company. The aim of this paper is to define the strategy of market development by applying innovations, providing quality services to tenants and achieving business goals of sellers based on consumer satisfaction. You need to know what marketplaces really are. Retail marketplace means a space, usually covered, which unites the commercial offer of companies and entrepreneurs registered for production and trade and retailers that offer a wide range of food products for everyday use and other non-food products, all under the auspices of one administration. (World Union of Wholesale Markets, 2022).

By reviewing the functioning of markets on a global level, we notice the trend of development of wholesale marketplaces and retail marketplaces in urban areas. These are coordinated national marketplaces, professional management and modernisation of the agricultural products market. With the longest tradition in the city, the Fish Market has grown from a place that in the middle of the 19th century exclusively for supplying citizens with fresh fish, over time it has grown into a classic green market. (www.nstrznica.co.rs).

A relevant aspect for research into the application of innovation, product sales and customer satisfaction stems from the traditional importance of the Fish Market. The commitment to research special knowledge stems from the inadequate use of this marketplace and its market opportunities. The first level in the realization of strategic activities is SWOT analysis, ie internal analysis (strengths and weaknesses) and external analysis (opportunities and threats). The goal of these activities is to look at the current position of the market and projections of future development. Levels in harmonising the state of marketplaces with the market are:

The process of strategic planning of marketing activities—SWOT analysis.

Swot analysis of market potentials of the market

External aspects of SWOT analysis

Opportunities

- By applying innovations, marketplaces become efficient and effective distribution channels for agricultural products
- Specialised market institutions where the interest of producers, sellers, buyers and marketplaces is most efficiently realised
- Enabling the development of domestic agricultural production, with the help of the state and the development of farms that can produce quality domestic product at an affordable price
- Customer interest and marketplace development
- Adapting to new global market circumstances and consumer needs

- The construction of modern marketplaces creates the conditions for increased sales
- Marketplace development strategy by gaining a competitive advantage over other companies
- Development of marketplaces as a city - public and infrastructural centre
- Creating a marketplace position of the so-called “marketplace brand”
- Continuous research of consumer needs, attitudes and perceptions
- Integrated marketing—communication strategy of communication with sellers, buyers and other interested public.

Threats

- Sale of goods outside market and tax transactions
- Mass application of non-cash payments
- Competition in the form of a large number of distribution centres and supermarkets that also trade in agricultural products
- Changes in the market in the attitudes and needs of customers
- Inadequate quality of service
- Regulated system of legislation, legal and property relations.

Internal aspects of SWOT analysis

Strengths

- Location advantage of markets and enriched offer
- Adoption of a national strategy for the construction of modern marketplaces in all major cities
- Application of innovations in business
- Application of modern technologies
- Assisting domestic agriculture and stimulating the sale of products on the marketplace
- Strategic approach to the importance and management of marketplaces
- Quality of offer at traditional basis
- Direct trade, interest of sellers and buyers
- Sale of traditional domestic products
- Stimulating the sale of organic healthy food
- Survey of consumer attitudes
- Improving the quality of service on the principles of developed countries
- Adapting to market changes, in the domestic, regional and global markets through the standard of service

Weaknesses

- Non-adoption and non-implementation of development strategies and visions
- Outdated technologies in business with no innovation application
- Undefined market relationship in terms of compliance with legal, commodity-money and tax solutions.
- Lack of a clear vision of the relationship and development of wholesale markets and markets

- Infrastructural equipment, market position of markets
- Influence of political factors management inadequacy
- Inadequate marketing—communication communication strategy.

The results of the SWOT analysis indicate that the marketplace activity in Serbia has potential. In the first place, the marketplace chance is an enviable interest of customers for this form of supply and a potential increase in their needs.

If we look at the SWOT analysis and the previous data, we can conclude that consumer interest in shopping in the marketplaces is still great. These chances will lose importance over time, given the activities of competing companies. The condition and position of the markets must be defined by a better marketplace position and location. It is necessary to apply investments in innovative aspects of business that will enable traffic control and increase the quality of service to tenants and sellers. In developed countries, the trend of developing green markets rests on the extension of working hours followed by additional services to consumers. (Kuzman et al., 2022).

If we look at the Strategy for the Development of Agricultural Production and Rural Development of the Republic of Serbia for the period 2014-2024, we notice that the aspect of trade development through wholesale marketplaces and retail marketplaces is insufficiently researched and emphasised. The construction of wholesale marketplaces in larger cities would create opportunities for investment in marketplaces based on customer requirements and development trends of these institutions in the global market.

In further research, we will look at the possibilities of increasing the income of marketplaces by applying biddings by the method of auction in the issuance of business premises and marketplace stalls. A good assessment of the structure of the auction is suggested, in order to increase the probability of achieving the maximum benefit in business (Camilleri, 2015). The trading effect is reaching the maximum price that the buyer is willing to pay. (Prdić et al., 2019).

In addition to innovations in terms of networked information networks that give marketplaces the opportunity to promote in a modern and market-acceptable way, additional income in the marketplace business is enabled by auctions in the issuance of space and stalls. In order to reduce the possibility of manipulation during trading, the auction may also include such a possibility of random bidding time or the possibility that orders submitted during the auction remain binding until the end of the auction. (Biais et al, 2014).

Greater interest in marketplace spaces certainly stems from knowledge about the maintenance, process and end of the auction, on the basis of which markets as companies come to new revenues, tenants to the desired space and customers satisfaction with a larger product offer.

Introduction of innovations for the purpose of more efficient marketplace operation

The goal of introducing innovations is easier marketplace management in terms of business and traffic control. In addition to this goal, the innovation aims to:

- Achieving interactive communication between marketplaces and tenants of business and marketplace space

- Increased business income as a result of interaction
- Valorisation of internal strengths of the company in the form of knowledge and skills of employees
- Competitive advantage in the marketplace based on increased market performance by creating conditions for larger-scale trade
- Emphasise the traditional importance of marketplaces for domestic producers through innovative activities.

Changes in the innovative sense for marketplaces also mean certain organisational transformations adapted to the marketplace and the functioning of marketplaces on a global level. These innovative transformations in the functioning of marketplaces must go through the whole process of changes in the organisational and marketing sense. These innovative processes involve internal processes in terms of decision-making and job organisation. When it comes to external processes, marketplaces as public market institutions must coordinate changes with other city institutions and organisations. These changes affect the social significance of the marketplace, so social marketing activities must be directed towards that planned goal. That's why the use of mobile devices has multiple meanings, both in the efficiency of market operations and in easier work with sellers, all with the aim of accessibility and better communication with consumers. (Prdić et al., 2022).

Budget revenues are public revenues. (Mihajlović et al., 2022). Small and medium-sized enterprises financed by venture capital certainly have a leading role in the number of innovations. (Dželetović et al., 2017).

Small and medium enterprises are the leaders at the global level in the application of innovations. If we add the importance of innovation in business to the position of the famous professor of management Peter Drucker that real profit is only that obtained by innovation, it is clear what their importance is. It is the information age that gives the opportunity to develop ideas, innovations and potentials of each employee, which frees up space for creation that brings success. Advantages of trade in markets that apply innovations and technological changes:

- Modern trade service that enables communication before arriving at the marketplace
- Comparative advantage of the market in terms of volume of supply, product quality and direct knowledge
- Costs for salespeople per contact are very low compared to other forms of sales and marketing
- Information on domestic product from the regional area through joint information with sellers
- The most direct form of research in marketing as well as personal research of customer attitudes
- Traditional interest of print and electronic media in markets
- Large number of customers in a relatively small space
- Through innovative internet communications, the possibility of attracting customers to the point of sale
- Possibility of joint internet promotion of markets and sellers
- Easier definition of marketing communication strategy to attract customers to the marketplace

- The possibility of attracting customers to the point of sale through their own marketing communication
- Contribution to the city and community and development of social marketing principles.

Disadvantages of traditional marketplaces in the current market:

- Lack of a national market development strategy
- Disregard for changes and innovations in business
- Non-promotion of domestic production
- Marketplaces are expensive market institutions
- Inadequate technical-technological services to tenants
- Low level of additional services - most importantly, lack of parking space.

Having in mind the previous knowledge, as well as the modern importance of marketplaces on the market of developed countries, where innovations are an integral part of the development of the market of agricultural products, it is necessary to adopt a strategy for marketplaces development in the future. This strategy must be in line with the development of wholesale as the main place to supply marketplaces with quality products. If we look at marketplaces as traditional market institutions, we combine the old advantages of modern communication with innovations in order to sell more products. All the traditional advantages of the marketplaces need to be adapted to new conditions and innovative and sophisticated customer attitudes. When it comes to services that can enable tenants better communication and higher sales are:

- New interactive service centres that provide access to customers and introduction to products
- Internet and banking services that enable all types of payments
- Information on sellers and terms of deferred sale
- Possibility of internet promotion of sellers.

Providing modern marketplace services using technical-technological systems

These systems allow for greater interconnection of wholesale and retail agricultural products. Concentration of the offer on the wholesale market enables the sellers on the marketplace to offer a larger offer of products due to the possibility of storage on the marketplace. These systems allow small domestic producers to store goods on the basis of which they can be competitive as a domestic product. Vendors of domestic products with an adequate sales strategy can expand their range of sales to imported ones such as southern fruits due to the possibility of storage in refrigeration systems.

Marketing of communication activities of sellers in the marketplace

The survey of sellers' attitudes was conducted in 2022 in the period 20th May -10th June 2022, on a sample of 50 sellers of fruits and vegetables at the Fish Market in Novi Sad. 30% of respondents were satisfied with their income, while 25% of respondents

did well, only 7% of respondents did very well. As the most important instrument of marketing control of business, respondents stated (range from 1 to 5; 1 is the most important):

- Sales volume 1%
- Profit 3%
- Market share 3.1%
- Liquidity 2.3%
- Sales promotion 1.6%.

From the aforementioned research, it can be concluded that the volume and sales promotion is the most important instrument for sellers. To the specific question of whether you keep a database of customers, 29% of respondents answered affirmatively and 71% did not. To the specific question of how much innovation would contribute to your better business, 81% gave a positive answer and 19% a negative answer. Attitudes of respondents when it comes to market conditions in the market show that 30% are satisfied, 40% dissatisfied while 20% think that conditions can be much better. The previous position is also confirmed by the opinions of the sellers that it is necessary to enable better conditions of sale. The answers to the specific question of what you would change in the marketplace are as follows:

- Better conditions must be created for maintenance, storage and cooling of products in the marketplace 24%
- Innovations are needed in terms of market organisation and application of innovative solutions in the payment of 21%
- Enable modern technologies to minimise contact with marketplace workers and network communication with customers 20%
- Provide better conditions for distribution of goods 18%
- It is obligatory to plan and infrastructurally equip the parking space for sellers and buyers 17%.

When it comes to the answers of tenants why they sell at the Fish Market, the answers were, *because I have my product* 33%, *we sell at the market for a long time* 23%, *I have constant customers* 19%, *it is the best place to sell domestic products* 15%, *it is the oldest Novi Sad marketplace* 10%. When it comes to the attitudes of customers on a sample of 300 consumers in the same marketplace, the answers to the question about the number of purchases were as follows: *I go to the marketplace once a week* 52%, *twice a week* 36%, *three times a week* 12%.

The motives of the surveyed consumers about shopping at the Fish Market are as follows:

- Product freshness
- Product quality
- Habit and meeting acquaintances
- Variety of offers from well-known sellers
- Marketplace location.
- To the specific question of what you would change in the marketplace, the answers are as follows:
 - better information about the work of the marketplace
 - greater product offer

- possibility of electronic communication with the marketplace and the seller
- variety of services and secured parking space.

If we analyse the previous data when it comes to both buyers and sellers, we see that they are interested in innovative changes that will increase sales and mutual communication. The main advantage for selling at the Fish Market is the possession of one's own product, the continuity of marketplace sales and constant customers. Consumer attitudes about the frequency of shopping in the marketplace show the values of at most one visit to the marketplace. If we notice that the frequency of going to the marketplace once and twice a week is high, the assumption is that the value of the purchase is also significant. However, sellers notice the importance of modernising the work of the marketplace in a technical-technological and innovative approach. They are aware that the level of their sales will decline over time, so they demand the application of innovations and market competitiveness. They also recognise the importance of additional services in the form of distribution of goods, parking spaces and conditions for all-day operation of markets.

The fact is that the most important interest of the seller in communicating with consumers on the market is meeting their expectations on a daily basis. It follows that the daily interests of consumers are the foundation of good relationships and long-term loyalty. The living word is a created look in the eyes of consumers in the markets as an everyday meeting place. Through the living word, the seller establishes an honest relationship with consumers in terms of a satisfied customer and a loyal partner.

The role of the seller's communication skills is reflected not only in achieving consumer satisfaction but also in developing their long-term loyalty. (Šapić et al. 2018).

The fact is that the most important interest of the seller in communicating with consumers in the market is to meet their expectations on a daily basis. It follows that the daily interests of consumers are the foundation of good relationships and long-term loyalty.

The word-of-mouth is actually a look in the eyes of the consumer at the markets as an everyday meeting place. Through the word-of-mouth, the seller establishes an honest relationship with consumers in terms of a satisfied customer and a loyal partner.

One of the basic problems faced by agricultural producers is the sale of products (Zarić et al., 2016). The reasons are many, but the most important is the poor management of the crisis. (Milačić et al., 2020).

It is necessary to undertake the activities of sellers in order to increase sales focused on the thinking of customers and their perceptions. Their marketing communication activities must be aimed at managing customer perceptions and changing them as needed. To the specific question about the spent funds of customers in the previous year that are important for their business, the answers of the sellers are the following:

- small—about 100,000 dinars
- large—about 300,000.00 dinars
- potential—did not buy the seller's products.

For the sake of objectivity of researching the importance of customers at the Fish Market, we can divide them into small, large and potential ones.

Table 1—Characteristics of customers in the market

Customers' characteristics	Who visited the selling spot	Who have not visited the selling spot	TOTAL
1. Small	101	408	509
2. Large	49	235	284
3. Potential	200	850	1220
TOTAL	350	1493	2013

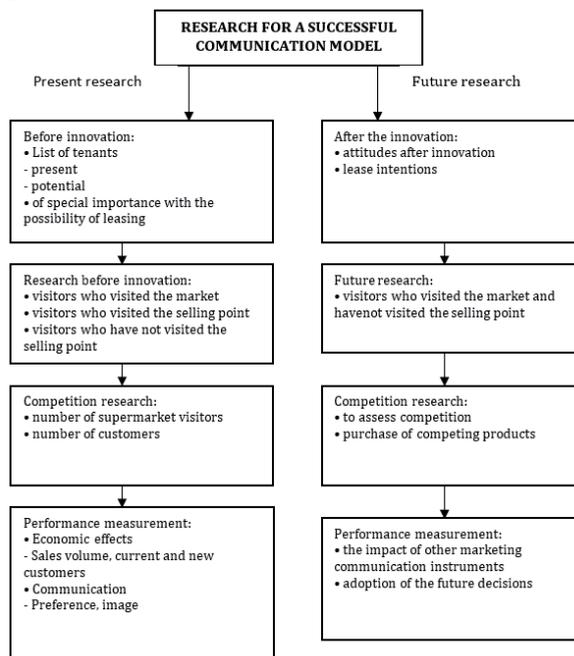
Source: Own research

Table 2—Purchase plans after visit to the selling spot

	Arithmetic mean*	Standard error
Small customers		
Visited the seller	2,78 (n = 180)	0,21
Have not visited the seller	2,9 (n = 172)	0,17
Big customers		
Visited the seller	2,87 (n = 170)	0,15
Have not visited the seller	3,05 (n = 160)	0,20
Potential buyers		
Visited the seller	5,0 (n = 199)	0,10
Have not visited the seller	5,0 (n = 200)	0,10

* 1—no plans; 5—very defined plans n = number of buyers. Source: Own research

Figure 1-Model of successful communication in the market



Source: Own research

After conducting research for the purposes of this paper, the conclusion is that the actual state of the marketplaces in the domestic market in terms of innovation is quite low. A special analysis of the effects of innovations on increasing market turnover is needed.

When it comes to the first hypothesis of the research that increased revenues are expected through the application of innovations, the conclusion is that with good marketing planning, higher revenues can be expected. Traffic control at the marketplaces is possible from a special development centre, which would be possible with certain technologies using the Internet. At Fish Market, payment and control have been physically facilitated through mobile telephone billing, but this is just the beginning in that direction. If we accept the attitudes of sellers and buyers in the marketplace that innovations, technical and technological services are necessary, it is clear in which direction we should go. The attitudes of sellers and buyers are similar in terms of other services they can perform in the marketplace as a place that is their local space. Special parking space services also create the ambience of a good place of purchase with these attitudes, where the overall interests of markets, tenants, sellers and buyers can be increased. So, the first research hypothesis has been proven, if we take the example of introducing innovations in the marketplace business based on the attitudes of sellers and buyers. The economic effects on the business of the marketplaces will also be reflected on the utilization of business premises and trade control, and the business result will increase as an effect of a larger volume of trade. The increased business result of the marketplace can also be calculated through the rate of return on investment by investing in innovation, which also confirmed the first hypothesis.

When it comes to the second hypothesis of the research that customers who visited the point of sale will have greater knowledge of the product, it is confirmed by the views of the sellers themselves (Table 1). Namely, the sellers perceive the marketplace as an efficient place of trade, but they do not keep records of potential buyers and do not keep a database of buyers. By communicating activities to attract customers to visit the point of sale, the chances of buying products are much higher.

When it comes to the attitudes of customers who visited the point of sale in the third hypothesis of the research, it is necessary to research the attitudes and perceptions of potential customers, before coming to the marketplace, at the point of sale, and especially by promoting sales on the spot. The goal is to influence customers with various communication activities and a database before coming to the market, after arriving at the market and coming to the point of sale to buy a product or learn all about it. (Figure 1). If we analyse the model of successful communication in the market based on the conducted research for the purposes of this paper, we notice that the current research is the basis for changes in the future. The goal of researching the communication model on the market is a precondition for increasing the efficiency of investment by applying innovations.

When it comes to the second hypothesis of the research that customers who visited the point of sale will have greater knowledge about the product, it is confirmed by the views of the sellers themselves (Table 1). Namely, the sellers perceive the market as an efficient place of trade, but they do not keep records of potential buyers and do not keep a database of buyers. By communicating activities to attract customers to visit the point of sale, the chances of buying the product are much higher. By recording customers before

and after visiting the point of sale (Table 2), their perceptions of the significance of the sale will increase the overall effects of the seller's sales.

Visitors to the point of sale can be existing or potential customers. Communication activities before visiting the market need to influence potential customers to visit the point of sale. Researching the attitudes and perceptions of potential customers before visiting the market would have a strong impact on their purchasing intentions when it comes to products, especially after innovative changes in the market. Research has shown that the level of awareness about products at the point of sale is higher among those who visited the point of sale.

When it comes to the attitudes of customers who visited the point of sale in the third hypothesis, research shows that the level of awareness about the products of shopper visitors is higher than those who did not visit the point of sale, which confirms the third hypothesis. The product evaluations of potential customers who have visited the point of sale and are aware of the product are the result of specially acquired beliefs. When it comes to the level of interest in products from a particular point of sale, there is an obvious difference between potential buyers and those who did not visit the point of sale in the category of small and large customers, which confirmed hypothesis three. (Table 2).

It is necessary to research the attitudes and perceptions of potential buyers, at the point of sale from the point of view of customer size. It is necessary to keep databases of potential buyers before coming to the market, at the point of sale, and especially by promoting sales on the spot. The goal is to influence customers with various communication activities and a database before coming to the market, after arriving at the market and coming to the point of sale to buy a product or find out everything about it. (Table 2).

The research shows that potential buyers, when it comes to the level of awareness and interest, are fully coexistent with pre-defined research assumptions. From the above, a clear conclusion can be drawn that more research would contribute to a better result and more statistically relevant data. If we analyze the model of successful communication in the market based on the conducted research for the purposes of this paper, we notice that the current research is the basis for changes in the future. (Figure 1). The goal of researching the communication model in the market is a prerequisite for increasing the efficiency of investment by applying innovations.

Marketplaces were originally conceived as occasional market institutions for the retail sale of fruits and vegetables, and in the meantime they have grown into an everyday business. (Lovreta, 2008). Based on all the above, it can be concluded that marketplaces are an efficient place of trade and business that can increase their place and importance in global trade by applying innovations, technical-technological systems and additional services. All relevant elements of good communication are contained in the model of successful communication in the market (Figure 1). The goal of pre-innovation research is a prerequisite for increasing investment efficiency. Modern communication of sellers in the model emphasises the importance of communication with customers before visiting the marketplace, during a visit to the marketplace and the point of sale. The process of persuading a customer to visit a point of sale can add value to the seller. The model shows that own research and competition research can undertake activities that will lead to a change in marketing strategy in the future, as well as increase the

economic and communication effects of marketplace trade. Modern business and changes in innovation and technical systems require certain advisory institutions specific to the operation of marketplaces. Such systems contribute to major changes in business and determine the future of marketplaces in the market.

If we look at marketplaces as global markets in terms of their importance for a country's trade in agriculture, we can compare them through the index of competitive growth and the index of microeconomic competitiveness. Competitive growth in the global environment shows the ability to trade in agriculture through marketplaces. The sustainability of the competitive growth of marketplace trade in the global environment is measured by the degree of innovation. Contracts are made, products are purchased and new products are represented in such events. In order to develop the infrastructure of the agrarian market. (Boiko et al, 2019).

The overall market and trade in agriculture must be part of a development strategy through specialised market institutions such as retail marketplaces, wholesale markets, agricultural fairs, auctions and commodity exchanges. This research clearly confirmed that marketplaces are a direct form of trade that has future prospects through innovation. Research can contribute to the trade model through specialised market institutions in global trade in which marketplaces are the most direct form, where the very ideas of development come from customers.

Conclusion

The conclusion of the research is that the application of innovations can increase the competitiveness of marketplaces on the global market in trade in agricultural products. The importance of marketplaces for trade is very important if we look at the historical context, the context of the development of domestic production and consumption of healthy products of known geographical origin. It can be objectively and justifiably concluded on the basis of conducted research that marketplaces in the future are economically viable places of trade from the point of view of marketplaces, sellers and buyers. With innovative technologies, the marketplace will continue its historical role in the trade in agricultural products and become even more competitive on the market. By analysing the effects on the sales of sellers in the marketplace, it is possible to influence consumers to buy products by applying the model of successful communication in the marketplace. The overall economic effects of increasing marketplace revenues through innovation can be calculated by the degree of return on investment. It can be concluded that the conducted research has realised the precondition for efficient decision-making on the application of innovations in the market business. Research has shown that market vendors can increase their sales by applying marketing communication activities as an investment in terms of increasing trade. It has been established that by innovations and communication activities, markets and sellers can achieve a competitive advantage and achieve their goals based on the realisation of customer interests. As it is necessary for the application of innovations in the functioning of markets to be confirmed in a large number of scientific and empirical researches, this paper can serve as an example.

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Sanja Anastasija Marković¹
Jelena Petrović²
Milja Orlandić³

University Business Academy in Novi Sad
Faculty of Applied Management, Economics and Finance,
Belgrade

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A COMPARATIVE ANALYSIS OF TAX RELIEFS FOR INVESTING IN CULTURE IN SERBIA AND EUROPE

Abstract

This paper analyses the structure of state support for culture through tax relief meant for business entities for their investment in cultural institutions. Tax relief is an incentive from the state which creates a certain behavior among the taxpayers. Therefore, it is a very important segment of the association between economy and culture. Culture is the backbone of the identity of a state, which is an important reason why it should be nurtured and promoted. In this paper, the concept of culture has been narrowed down to include art and cultural institutions of national importance, since they are the most vulnerable virtually the world over, due to the considerable expense required both for the maintenance of the building itself, the funds needed to pay the numerous employees, as well as funding for production itself. In times of crisis, culture is usually the first to be affected by budget cuts. That is why encouragement of direct investments can maintain the level of quality of cultural institutions irrespective of the circumstances.

Key words: culture, art, cultural institutions of national importance, tax relief

JEL classification: H25, H71, K34

УПОРЕДНА АНАЛИЗА ПОРЕСКИХ ОЛАКШИЦА ЗА УЛАГАЊЕ У КУЛТУРУ У СРБИЈИ И ЕВРОПИ

Апстракт

У овом раду биће реч о структури државне подршке култури кроз пореске олакшице намењене привредним субјектима за улагање у установе културе. Пореске олакшице, представљају подстицај државе, који креира одређено понашање пореских обвезника. Из тог разлога, чине веома битан сегмент када је у питању повезивање привреде и културе. Култура окосницу идентитета једне државе, што је важан разлог за њено неговање и унапређивање. У овом раду, појам културе сужен је на уметност и институције културе од

¹ sanja.markovic@mef.edu.rs ORCID ID 0000-0001-7581-1199

² jelena.petrovic@mef.edu.rs ORCID ID 0000-0002-0391-8971

³ milja.orlandic@mef.edu.rs ORCID ID 0000-0002-4152-3567

националног значаја, јер су оне скоро свуда у свету најрањивије, с обзиром на велике трошкове које изискују како одржавање саме зграде, плате за велики број запослених, тако и саме продукције представа. У кризним временима, култура је обично прва ставка којој држава смањује новац који јој је намењен из буџета. С тога се подстицањем директних улагања, може одржати ниво квалитета које би институције културе требало да одрже без обзира на околности.

Кључне речи: култура, уметност, установе културе од националног значаја, пореске олакшице

Introduction

In every government, taxes play an important role in their programs and they are a tool to achieve the main goals in the economy (Kalaš, Mirović & Andrašić 2020, p. 4). Paying taxes is a legal obligation and is the most important source of revenue for the state budget. Taxes as such are imposed in the interest of the social community in order to finance its vital functions which are available to the entire population (Jovanović 2022, p. 81). The government plays a central role in economic development by providing the necessary amount of public goods, and encouraging productive investments, thus ensuring economic growth (Đaković, Inđić & Cicmil 2022, p. 140). One of the important items that the state manages and finances is culture. Culture affects the development both of individuals and society as a whole. According to the definition of cultural policy, culture cannot develop on its own, without any help from the state, and it is necessary, through different instruments and strategies of cultural policy, to determine the possibilities and needs for stimulating the further development of culture and art (Bajić 2017, p. 9). Cultural policy is a set of measures and activities through which the bearers of public policy manage the cultural life and cultural development of a country (ibidem, p. 15). Culture has a varied scope within a single society, including customs, religion, sports, and art. For the purposes of this paper, we have narrowed the concept of culture down to the part that pertains to art, and have carried out an analysis of investing in art institutions of national significance, opera houses in particular, which due to high maintenance fees require the highest investments.

Funding sources for culture

There are three types of funding that are characteristic for culture. The first is state funding, through which the state provides all the necessary funds for each of the institutions that are part of the state budget system. The second is private funding, which is entirely reliant on sponsorships, donations, patronages, and institutional self-generated income, while the third is a mixed type which combines state funding with other sources.

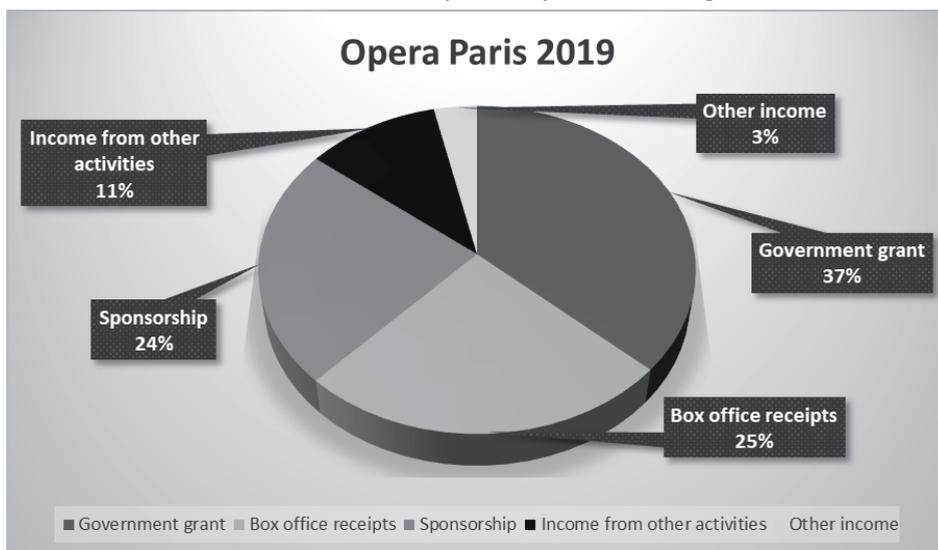
The first state system of sponsorship of cultural events dates back to Ancient Greece, to around 534 BC. (Berns 2009, p. 43). In Serbia, after World War II, funds for theater work were provided in full by the Ministry of Education, and it implemented its decisions regarding the development of theater activity via the Department of

Science, Culture, and Art. For the theater to survive at that time, whether or not it had an audience was not of key importance, nor was the size of the audience, nor whether a particular performance was considered successful by the public. (Prnjat 2019, p. 171). After the adoption of the Constitutional Law in 1953, this kind of centralized system slowly disappeared, and the financing of theaters passed into the jurisdiction of cities and municipalities. The exception were institutions of national significance. With the adoption of the first theater law, the General Law on Theater in 1956, it was expected that theaters would provide a part of the necessary funds themselves. This is how the mixed system of financing emerged. On the one hand, theaters continued to receive a part of their funding from the state budget, while on the other hand, as cultural institutions they had to generate a part of their revenue on the market to cover their costs. (Tausi 2012, p. 229-230).

In order for the cultural policy of the country to satisfy the real cultural needs of the people, the participation in culture of various actors from the public, private, and civil sectors is a prerequisite for building a better cultural environment (Kočović De Santo, Milovanović Rodić, Babović & Kuzma 2022). There are different forms of investment in culture promoted by governments so that they could reduce their influence. A government can intervene directly by allocating budget funds to fund culture, or it can do so indirectly by stimulating different forms of investment (fiscal policy, market development, movie theaters, employment incentives, etc.). In France, the proceeds from the production, distribution, and exhibition of pornographic content, as well as content that promotes violence, are used to finance film art. The money collected by the French Radio and Television Regulatory Authority (akin to our REM) is also deposited into this fund (Centre national du cinema et de l'image animee – CNC 2017, p. 200). The cultural policy of the Netherlands is based on the idea that the government should not be associated with the evaluation of art and science. That is why the development of culture is the result of the activities of citizens and a large number of foundations set up for cultural activities.

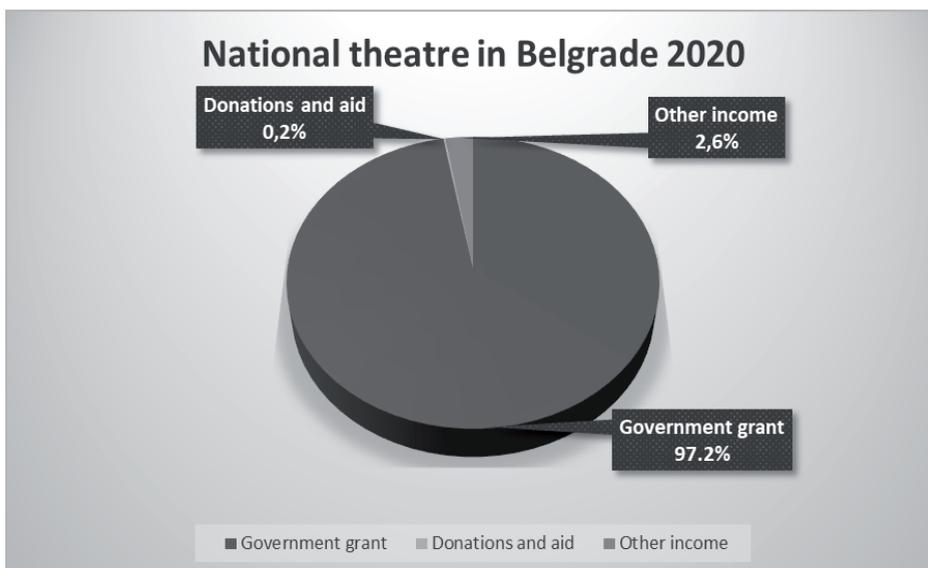
Over the years, the government has assumed the role of a moderator of cultural activities, instead of being the biggest patron of art and culture (Kaličanin 2011, p. 231). Regardless of the mixed source of funding, the state retains a role in financing culture when it comes to institutions of national significance. The percentage of these funds varies from country to country. The following graphs focus on the relationship between the funding sources for three large opera houses: the Paris Opera, the Royal Opera House, Covent Garden, London, and the National Theatre in Belgrade, which even though founded as a dramatic arts theatre, also houses a ballet and opera ensemble. For the purpose of this paper, we analyzed opera houses since the opera and the ballet are the most expensive forms of institutionalized arts. The graphs were prepared based on the latest available data for each institution, which for Covent Garden and the National Theatre are for the year 2020, while the last published data for the Paris Opera date from 2019.

Table 1. The structure of income for the Paris Opera



Source: Authors' based on data from the annual report available at: https://res.cloudinary.com/opera-national-de-paris/image/upload/v1616573122/Rapport_de_saison_19-20_FR_2_cobvqo.pdf, p. 34

Table 2. The structure of income for the Royal Opera House, Covent Garden, London



Source: The annual report available Royal opera, available at: <https://static.roh.org.uk/for/pdfs/ROH-Annual-Report-20-21.pdf>, p. 3

Among the funding sources for the Royal Opera House, a frequently recurring source is the Arts Council of England (*ACE*) and a *bridge* organization. The Arts Council is a type of foundation which focuses on investment in the field of culture, while *bridge* organizations bring together education and culture in order to make art available for as many children and young people as possible.

Table 3. The structure of income of the National Theatre in Belgrade



Source: Authors' based on data from the document outlining the implementation of the financial plan of the Republic of Serbia available at: https://www.narodnopoistorije.rs/media/documents/system/0/articles/5_2020.pdf, p. 6

The balance sheets of the National Theatre in sum present the remaining income, which mostly consists of various forms of self-generated income such as funds obtained from ticket sales, renting space, income generated on investment, etc.

The data indicate that the National Theatre in Belgrade to the greatest extent relies on subventions from the state, that is, budget funding (as much as 97.2%), while for the remaining institutions the state subventions are smaller compared to other sources of funding (the Paris Opera 37%, the Royal Opera House 13%). This additionally emphasizes the need to include the economy as a source of funding for culture, in order to increase the overall budget of the cultural institutions and thus improve the quality of the programs they offer, as well as reduce their dependence on the generosity of the state when determining the budget for culture.

Tax relief for investments in culture in Serbia and around the world

A system of tax relief is used to stimulate a particular type of behavior among the taxpayers. Taxes can be used to encourage residential construction, education, the work

of cultural institutions, etc., depending on the way in which the country encourages or sanctions taxpayers. This can most frequently be seen in lower tax rates for products which make up the basket of goods, a tax decrease on baby equipment with the aim of increasing the birth rate, and on the other hand in the introduction of a higher tax rate on luxury items as well as other merchandise, to destimulate their consumption (tobacco, alcohol).

In addition to goods, certain services have also been included in a series of tax reliefs, in order to encourage investment in these areas, and thus provide affordable services for a greater population. One of these reliefs is decreasing the income tax for a business entity if it sets aside a part of its income to fund culture.

Tax policy and regulations are a well-known instrument used to support the increase in consumption and competition and enable more favorable positions and engagements for artists. The VAT on cultural goods is lower than the regular rate of VAT, or these goods and services are exempt from taxation. These measures keep the prices of cultural products and services low, so that culture can be available to a greater segment of the population, and render the entire sector more competitive (Kisić 2011, p. 212). In Ancient Greece, the wealthier aristocrats financially supported sports and arts events (Brakus 2019, p. 197). Each year the head judge of Athens would choose one of the wealthier citizens to finance the City Dionysia festival. The financier of the festival would be known as the *choregos* (Gk. χορηγός / chorēgós), and the year he financed the festival he was exempt from taxation (Harvud 1998, p. 58).

In the field of culture, there is a frequent and at the same time incorrect opinion according to which the economy is viewed as something completely removed from artistic and creative activity. Quite the contrary, the economy extends much farther than the narrowly defined market and expands into segments with which it seems incompatible (Nestler & Malik 2016, p. 94-95). The importance of the economic aspect of society, and thus the economy of a country, through the prism of artistic creation is reflected precisely in the mixed type of funding where considerable emphasis is placed on sponsorship deals and donations, but also in the system of tax relief which a business entity is entitled to when investing in culture. This creates a strong bond between culture and economy in which the traditionally omnipresent opinion that culture and the economy, and culture and the market, must not be connected is lost. On the one hand, cultural institutions receive more funds which they invest in quality programs and thus fulfil their social role which refers to preserving tradition, as well as acting as a means of education for the population, while on the other hand, considering that these endeavors improve the level of social identity of a country, city, or municipality, this makes them a favorable basis for the demonstration of the “social responsibility” of a business entity which thus attains greater respect in society and attracts attention to itself and its business dealings (Dragičević Šešić, Mikić & Jovičić 2007, p. 277-318). This paper compares tax reliefs in Italy, England, and Serbia. Italy and England have been selected as examples because the websites of their most famous opera houses (the Royal Opera House, Covent Garden, London and the Teatro alla Scala in Milan) promote this type of investment and the stimulations offered by the state.

Tax relief in Italy

The Italian tax law provides tax relief both for companies and for individuals. According to Article 15, paragraph 1, subsection i) of the Italian Law on Income Tax (available at <https://www.altalex.com/documents/leggi/2014/12/10/tuir-titolo-ii-capo-ii-base-imponibile-societa-enti-commerciali-residenti#61907>), charitable donations given by individuals which are meant for production purposes in various fields of activity, according to the IRPEF (personal income tax), can be deducted up to 19% for a sum which does not exceed 2% of the total reported income. The deduction can be used in the year in which payment has been made. When it comes to donations from foreign companies, Article 100, paragraph 2, subsections g) and m) of the Law on Income Tax in Italy states that for charitable financial donations of entities which are subject to corporate income tax, and which are given to institutions, foundations, and associations recognized by the law in the field of cultural heritage, in order for them to perform their institutional activities and realize their cultural programs, taxes are deducted in amounts not exceeding 2% of the reported company income (the information is available on the Scala website at: <https://www.teatroallascala.org/en/companies-and-the-theatre/support-the-theatre.html>)

Tax relief in England

England has a special organization (*Charities Aid Foundation*) which cooperates with individuals and the economy, collects donations from them, and through which they receive tax relief for their donations. The website of one of the most important cultural institutions, the Royal Opera House, Covent Garden, provides information on tax deductions for donations as well as on the functioning of the system of donations. Thus, the Royal Opera House Covent Garden Foundation receives an additional 25 pence for every pound that is donated. For example: for a 10-pound donation this is an additional £2.50 for the Royal Opera House Covent Garden Foundation. As a donor, if you are paying taxes at one of the higher tax rates, 40% or more, you can request a return on your investment in this additional amount, which would mean that Covent Garden receives £12.50, while the expense for the taxpayer paying taxes at a tax rate of 40% and more is only £7.50. (available at: <https://www.roh.org.uk/support/making-the-most-of-your-donation>). Based on the current tax laws, companies with limited liability, for donations of up to £100 have a deductible of 25% of the donation, for donations from £100 to £1000, 25% for £100 plus 5% for the difference between £101 and £1000, and for donations in excess of £1001, the deductible is 5% of the maximum £2500 (available at <https://www.charitytaxgroup.org.uk/tax/donations/gift-aid/donor-benefits/>).

Tax relief in Serbia

According to the Corporate Profit Tax Law, expenses for investments in the field of culture, including cinematography, are accepted as expenditure of up to 5% of the overall income (Corporate Profit Tax Law, Article 15, paragraph 3). According to Article 4 of the

Rulebook on investments in the field of culture, culture-related investments, made to cultural institutions, art associations, faculties, academies, art schools, and other local legal entities are expenses recognized as expenditures if they are aimed at the reconstruction of existing cultural establishments and the construction of new ones, as well as the conservation and restoration of cultural property, as well as the preservation of the non-material cultural heritage, programmed activities, or for the production and equipment which is used to perform cultural and art activities. (available at <http://www.pravno-informacioni-sistem.rs/SlGlasnikPortal/eli/rep/sgrs/ministarstva/pravilnik/2018/78/2/reg>). Based on this rulebook from 2002, the percentage was only 1.5%.

Conclusion

Taxes, as one of the most important revenues of the budget, are imposed in the interest of the social community in order to finance the functions of the state available to the entire population. In addition to financing healthcare, education, public roads, national defense, etc. one of the important items that the state takes care of and finances is culture. Culture influences the development of an individual, and therefore society as a whole, and represents the framework of a country's identity. Culture represents a wide range of things within a society, such as amenities, religion, sports as well as art. For the purposes of this work, the concept of culture is narrowed down to the concept of art and artistic institutions of national importance, specifically to opera houses, which, due to the high cost of maintenance, require the largest investments. Tax relief represent stimulus, thus creating a certain behavior of taxpayers. Tax relief can be given directly to cultural institutions, but also to economic entities in order to encourage investment in culture and art. In the paper, we dealt with tax relief for business entities in different countries, but also analyzed the income structure of three large opera houses. Opera of Paris, National Opera Covent Garden in London and National Theater in Belgrade. Based on the aforementioned, Serbia is not lagging behind in terms of tax reliefs determined for providing funding in culture compared to the two analyzed European countries, Italy and England. On the other hand, the participation of the state in financing the National Theater in Belgrade is very high compared to the other two opera houses. Therefore, further research should be directed towards the behavior of business entities, the reasons for insufficient investment in the field of culture, as well as the additional promotion of tax relief offered by the state to business entities for investments in the field of culture and art. A good model of promotion can be found on the websites of the Italian Opera La Scala Milano and Royal opera Covent Garden London. Such a model should also be followed in Serbia if we want additional investments in cultural institutions, and therefore better and higher quality programs offered to viewers.

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Slavica Popović¹
*University Union Nikola Tesla Belgrade,
Faculty of Applied Sciences Niš*

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Milica Cvetković²
Faculty of Business Economics and Entrepreneurship Belgrade

Mira Avramović³
*Academy of Vocational Studies Southern Serbia,
Department High Business School, Leskovac*

GREEN MARKETING IN THE FUNCTION OF SUSTAINABLE DEVELOPMENT

Abstract

The concept of green marketing arose in response to climate change and global warming. As a part of a holistic marketing concept, green marketing includes activities related to adapting production processes, product modification, improving packaging and product labeling systems, communicating the environmental benefits of products, in a way that has minimal negative effects on the environment. According to the principles of green marketing, every instrument in the marketing mix has a green perspective.

National economies and enterprises have recognized the value of green marketing in meeting the needs and demands of consumers, but also as an incentive for growth and expansion of economic activities. The paper analyzes the concept of green marketing, as well as the instruments of the green marketing mix to understand its importance in modern business conditions. Environmental taxation, as an integral part of green marketing, indicates the importance and significance of preserving the environment in the function of growth and development of the economy. It is emphasized that the marketing strategy should be a response to the changing market needs, but also an incentive to create environmental awareness of consumers.

Keywords: *sustainable development, green marketing mix, green consumer, environmental taxation*

JEL classification: *E60, M310*

ЗЕЛЕНИ МАРКЕТИНГ У ФУНКЦИЈИ ОДРЖИВОГ РАЗВОЈА

Апстракт

Концепт зеленог маркетинга настао је као одговор на проблеме климатских промена и глобалног загревања. Као део холистичког маркетинг концепта, зелени маркетинг обухвата активности које се односе на прилагођавање производних процеса, модификацију производа, унапређење система паковања и

¹ slavica.popovic@fpn.rs, ORCID ID 0000-0003-4985-929X

² milica.cvetkovic@vssep.edu.rs, ORCID ID 0000-0002-1235-3570

³ mimi.avramovic@hotmail.com, ORCID ID 0000-0003-2995-5831

обележавања производа, комуницирање предности еколошких карактеристика производа, на начин који подразумева минималне негативне ефекте на окружење. Сваки инструмент у маркетинг миксу, према принципима зеленог маркетинга, има зелену перспективу.

Националне економије и предузећа су препознала вредност зеленог маркетинга у задовољавању потреба и захтева потрошача, али и као подстицај за раст и ширење привредних активности. У раду је анализиран концепт зеленог маркетинга, као и инструменти зеленог маркетинг микса у циљу разумевања његовог значаја у савременим условима пословања. Еколошко опорезивање, као саставни део зеленог маркетинга, указује на важност и значај очувања животне средине у функцији раста и развоја привреде. Наглашава се да маркетинг стратегија треба да представља одговор на променљиве потребе тржишта, али и подстицај за креирање еколошке свести потрошача.

Кључне речи: *одрживи развој, зелени маркетинг микс, зелени потрошач, еколошко опорезивање*

Introduction

The modern knowledge-based economy is characterized by continuous change. Thus, national economies and economic entities are forced to create new business policies and strategies to respond to the challenges posed by innovation, technology, and market changes. The need for responsible behavior is becoming imperative through the constant harmonization of business and marketing decisions with the goals of sustainable development and socially responsible business.

There is an opinion, in economic and environmental practice and theory, that most of the natural resources have a regenerative character, so that rational use can restore wealth and that efficient use can increase wealth in total. It is therefore necessary to direct economic measures on protection and preservation of nature through the philosophy of sustainable development. As legislation fails to ensure the rational use of resources and effective protection against pollution, economic instruments (environmental taxation) are used as an effective protection mechanism.

Socially responsible behavior of the company maximizes the positive and minimizes the negative impacts of business on society. To be successful, companies must anticipate and respond to the demands of society. Consumers appreciate such activities, which improves the image and market position of the company. That is why an increasing number of companies are trying to accept and implement the concept of green marketing in their business. Through green marketing, businesses aim to produce and sell products that are healthy and environmentally friendly. Investing in this type of activity requires great support from both the state and consumers themselves. In the long run, investing in green marketing has prospects, especially in the markets that are oversaturated with products that are neither good quality nor good for consumers and the environment.

The concept of green marketing

As a modern business concept, marketing is characterized by continuous upgrading and development. According to Charter, Peattie, Otmany & Polansky (2002), there are three marketing approaches, which reveal the development of this discipline and the existence of environmental commitment of the economy and economic participants. They distinguish the following:

I. Ecological marketing, which dates back to the 70s of the last century and is aimed at challenging products and production methods that hurt the environment;

II. Green marketing that emerged in the 1990s and reflects the need for significant changes in traditional consumption patterns to reduce the harmful effects on the environment;

III. Sustainable marketing, whose focus is to achieve a triple result - the creation, production, and delivery of sustainable solutions, while constantly meeting customer needs (Charter, Peattie, Ottman & Polansky, 2002).

Environmental marketing is “an approach that emphasizes products and production methods that improve environmental performance, encourage environmental processes or solve environmental problems” (The Dictionary of Sustainable Management, 2008). The most important issue for environmental marketing is the specificity of the relationship between supply and demand. Green marketing includes activities for the development of environmentally friendly products, which are designed to minimize the negative effects on the environment. As a part of a holistic marketing concept, green marketing encompasses a wide range of activities from product customization, modification of production processes, improvement of product packaging and labelling systems, to advertising activities in the least harmful way, constantly raising awareness of the importance of green marketing. The United Nations Environment Program (United Nations publications, 2012, p. 146) states that green marketing includes activities undertaken to promote the environmental performance of products or products that are socially acceptable.

According to the principles of green marketing, every instrument of the marketing mix has a green perspective (FuiYeng & Yazdanifard, 2015; Stanković, Đukić & Stanković, 2019). Although there is no product available that has no impact on the environment, a green product is the one whose use has the least impact on the environment. Natural, ecologically sustainable and manufactured from recycled materials would be an ideal product. It satisfies the demands of environmentally conscious customers.

Throughout its life cycle, the green product is designed using as minimal natural resources as possible and to have an as little negative impact on the environment as possible. The cost of making green products is higher, bearing in mind that there are higher criteria applied to the creation of green products and because it is a matter of generating small quantities. As a result of these factors, a green product manufacturer may find itself at a competitive disadvantage. But at the same time, the production of green products can be an effective strategy for differentiating the company's offer. By emphasizing the functional and emotional advantages of green products - their characteristics compared to conventional products that meet the same needs of consumers, the company differentiates itself from the competition. That is, the company benefits from the group of customers who are willing to pay a premium price for environmentally friendly products.

Eco-labelling is a tool for identifying products that are ecologically friendly and safe. It informs consumers about the green product and has a beneficial impact on their decision to purchase it. The green label information is based on a study of the product's environmental impact throughout production, distribution, consumption and disposal. In the Republic of Serbia, according to the Law on Environmental Protection from 2018, the ecological label is determined for products/services whose production, placement, consumption and disposal pollute the environment less, or which are obtained by recycling waste. According to the data of the Environmental Protection Agency, in the Republic of Serbia in 2018, three companies can use the eco-label for seven of their products or groups of products.

The European Union Eco-label is awarded to products/services that meet high environmental standards throughout their life cycle. Defined criteria for obtaining the eco-label promote the circular economy, encourage producers to create products that can be recycled, give guidelines to companies to minimize the harmful effects on the environment.

Table 1: The number of products/services with Eco-label (EU countries)

Country	Number of eco-labelled products / services
Spain	17.139
Italy	13.181
France	8.347
Germany	7.780
Belgium	5.582
Sweden	5.521
Czech Republic	5.187
Portugal	5.109
Greece	3.559
Poland	3.175

Source: <https://ec.europa.eu/environment/ecolabel/facts-and-figures.html> (accessed on 18 December 2021)

According to the data of the European Commission for September 2021 compared to March 2021, the number of issuing eco-labels increased by 8%, and the number of products/services that have an eco-label by 7%. In September 2021, a total of 83,590 eco-labelled products or services were registered at the European Union market in 23 product categories. Observed by country, the largest number of eco-labels were awarded to companies in Germany (17%), France (16%), and Italy (15%). The situation is similar taking into account products/services. The large number of products/services that have eco-labels are characteristic of Spain (21%), Italy (16%), France (10%), and Germany (9%). Table 1 shows the countries of the European Union that have the largest number of products/services with an eco-label.

The Global Ecolabelling Network (GEN) is a non-profit association founded in 1994 in Stockholm, intending to provide environmental assistance with the eco-labelling of green products/services. Eco-labels are based on the principles and procedures of the

ISO 14024 standard. The goal of the association is to improve efficiency by transferring acquired experience and information, but also to develop standards and promote eco-labels globally. The Association has 27 full and 10 associate members representing 60 countries (GENMAG, 2021). Based on the established standards, the members of the association define the criteria for the categories of products/services. Table 2 shows the member countries of the GEN Association with the largest number of eco-labelled products/services at the global level.

Table 2: Member countries of the GEN Association and the number of eco-labelled products

Country	Programme name	Valid standards	Companies participating	Certified products
China	China Environmentally labelling (CEC)	104	3778	800.000
Netherlands	On the way to Plant Proof	10	1.679	90.079
European Union	EU Ecolabel	24	1.400	70.000
Japan	Eco Mark Program	69	1.396	51.493
Nordic countries	Nordic Swan Ecolabel	61	1.500	29.000
Chinese Taipei	Green Mark Program	165	354	17.280
Korea	Korea Eco-Label Program	165	4.289	16.609
Germany	The Blue Angel Eco-Label	105	1.800	12.000

Source: According to [https://view.publitas.com/global-ecolabelling-network/gen-magazine-edition 40/page/12-13](https://view.publitas.com/global-ecolabelling-network/gen-magazine-edition-40/page/12-13), V (accessed on 21 December 2021)

Green price is an important factor that influences consumer decision-making about buying green products. Compared to conventional products, the price of green products is usually higher. Although environmentally friendly products should not be the basis for higher pricing, the fact is that their production, distribution, and promotion require significant costs. Consumers are willing to pay a premium price for green products because they perceive that the product is environmentally friendly and provides added value. Some consumers, on the other hand, choose an environmentally friendly alternative when deciding on a purchase, without considering the price.

Green distribution means the choice of distribution channels that ensure the availability of products to customers with a minimal negative impact on the environment. The relevant literature states that “green distribution includes all activities undertaken to reduce or eliminate environmental damage during transport” (Cankaya & Sezen, 2019, p. 101). The performance of green distribution is affected by factors such as packaging characteristics, the distance of the manufacturer from the customer, the fuel consumed by the vehicle during transport. To maintain high product quality, manufacturers can market green products through authorized distributors.

The focus of reverse logistics is on the product return from customer to supplier. “It is a key component of green supply chain management, as it helps to reduce waste generated by the handling and disposal of returned and used products” (Banihashemi, Fei & Chen, 2019, p. 3). Reverse logistics significantly contributes to the preservation of the environment by enabling the reuse of packaging and recycled products. Companies that use recycled materials in the production process significantly contribute to the preservation

of the environment. In addition to saving money, using non-renewable resources in smaller quantities, reducing energy consumption, reducing harmful emissions into the air and water, reducing the amount of waste, allow these companies to create the image of socially responsible company. For example, the fast-food chain McDonald's was the first to use napkins, boxes, and packaging made of recycled material. It is planned that only packaging made from recycled, renewable, and certified materials will be in use by 2025 (Geier, 2018).

Green promotion refers to the creation of marketing messages that inform consumers how products/services can meet their needs and desires in an environmentally friendly way. "The goal of green promotion is to influence consumers to choose products that do not harm the environment when making a purchase decision" (Thoria, 2018, p. 129). It should be emphasized that it is not allowed to deceive consumers by advertising non-existent "green features" of products (Tolušić, Dumančić, & Bogdan, 2014). By emphasizing the characteristics of products that do not harm the environment and communicating the importance of a green lifestyle, the company seeks to inform consumers about the need to protect and preserve the environment through marketing activities. Having in mind that the benefits of green products are intangible and that consumers cannot perceive them in the short term, communicating their benefits is a challenge for the company. Through advertising and public relations activities, the company can effectively inform consumers about the advantages of green products, and at the same time, can create the image of a socially responsible company in public.

To overcome the lack of consumer information about the need to preserve the environment, the relevant literature states that the company should encourage green promotion through the following (Kinoti, 2011, p. 269):

1. By informing consumers how an environmentally friendly product/service helps to protect the health and preserve the environment;
2. By convincing consumers that due to its performance, the green product/service is superior compared to conventional ones;
3. By choosing the appropriate forms of marketing communication to deliver a marketing message to consumers who are concerned about the environment;
4. By emphasizing the advantages of the green product/service - it appeals to the personal interest of existing and potential consumers.

Under the influence of the concept of green marketing, producers are focused on consumers who are motivated by environmental issues. Therefore, their policy and strategy are directed towards the green economy. The green economy is the result of many years of misallocation of capital. Green economists understand sustainable development as a new ecological-economic paradigm that represents a breaking point in the scientific revolution. The green economy is placed on the function of sustainable development in the literature, although economic growth is often carried out at the expense of the environment. The concept of the green economy aims to change the existing economic system in terms of its transformation into a sustainable one.

Green marketing and sustainable development

Socially responsible marketing, as a component of holistic marketing, is aimed at incorporating economic, ethical, legal, and environmental principles in business. It implies consideration of the interests of the social community or the public and the ethical, legal and social principles as well as context of the social environment. In addition, it includes marketing activities and programs, bearing in mind that the cause and consequences of marketing extend beyond the organization and consumers to society as a whole (Kotler & Keller, 2006).

As a consequence of the development of two separate systems of natural and social development, the ecological crisis began to abruptly escalate. The source of the crisis is the way an individual turns natural capital into private capital. The term sustainable development has been used more intensively since the 1980s, to emphasize the connection between development and environmental protection. In the United Nations Development Study, sustainable development is defined “as development that meets the needs of today’s generation without compromising future generations” (Črnjar & Črnjar, 2009, p. 79).

Despite the critical attitude of some authors that marketing encourages excessive consumption and the growth of the consumerist society, examples of marketing strategies aimed at sustainable development can be found more and more in the literature. “Addressing contemporary environmental problems, new strategies indicate a change in traditional marketing thought the strong commitment and support of the increasingly widespread practice of corporate social responsibility” (Sudarević & Milanov, 2015, p. 657).

Each socio-economic system independently decides how it will manage natural resources and harmonize their scarcity with the needs and desires of individuals. The concept of sustainable development is focused on climate change, combating air pollution, waste management, land protection, and management and water protection. High risks in the field of biological and genetic resources affect the accelerated transition to balanced development, which is implemented through incentive and regulatory measures. In the knowledge economy, this way of doing business means that the costs of environmental protection are included in the price of the final product.

The concept of sustainable development implies the process of balancing economic, social, and environmental requirements to ensure that the needs of present generations are met without jeopardizing future ones. “Sustainability expresses the principle that includes the permanent survival of natural resources, and development means the concept within the social science, which refers to the order of human resources. If both concepts are taken into account together, sustainable development is defined as the relationship between dynamic economic systems and larger ecosystems that are slowly changing and that must be in ecological balance” (Črnjar & Črnjar, 2009, p. 81). Sustainable development achieves its goals through economic development, social responsibility, and environmental protection.

The areas of sustainable development and marketing are basically at odds with each other. Marketing, which aims to increase sales and constant growth, is in contrast to sustainability, which aims to reduce total consumption and acts as a transformational change in society. Sustainable marketing is an approach that represents a bridge

between conventional marketing and sustainability (Rosemeier, 2015). One of the basic preconditions for the proper application of the concept of sustainable development, but also preventive action on the irresponsible behavior of individuals, companies, and regulatory bodies towards the environment, is to enable greater public participation in decision-making in environmental protection (Jančetović, Jovanović & Cvijić, 2012). The concept of sustainable development implies socially responsible business, but also a business that is aimed at preserving and protecting the environment.

Green marketing has influenced a large number of companies from various fields to focus on the production of sustainable products. The best example is the textile industry. To achieve compliance in the textile industry with the concept of sustainable development, it is necessary to incorporate the principles of sustainability in all segments of textile production, starting from design (eco-design, green design, or sustainable design), use of sustainable raw materials, and sustainable production methods to the final disposal or disposal of textile waste at the end of its life cycle.

In the conditions of greater consumer information and greater interest in preserving the environment due to climate change, green marketing is becoming increasingly important. Customers increase their competitiveness in the market. Also, insurance organizations and investment funds strive to create and implement a green strategy in their business activities.

Marketing as a science and discipline is evolving in line with changes in society, changes in the market, and changes in the needs and expectations of consumers who are increasingly interested in the concept of sustainable development. In order to succeed, market participants must react faster to the needs and desires of consumers than their competitors. One way is to adopt sustainable business practices that will help them reduce waste, increase customer satisfaction and loyalty, and thus, enable them to achieve competitive advantage and better business results.

Environmental taxation as a determinant of green marketing

In modern business conditions, taxes are becoming more and more common instruments of environmental protection. The introduction of environmental taxes is not aimed at increasing state budget revenues, but at improving the mechanism of managing the “green economy” and diversifying the instruments of environmental (green) marketing (Stiglic, 2004). This type of taxation is based on reducing negative externalities and is also called corrective taxes.

Environmental taxes are a specific type of economic instrument in the function of solving various environmental problems. They are designed to internalize environmental costs and provide economic incentives to individuals and legal entities to focus on environmentally sustainable activities. Apart from the fact that this type of tax aims to internalize external costs, an important goal of these payments is also financial income - which in some countries is at such a high level that the environment can be financed.

The highest amount of environmental taxes in the period from 2013 to 2019 was recorded in Denmark (21), followed by Italy (10), Sweden, and the United Kingdom (9). The financial income from environmental taxes is the highest in Denmark. The total average share of revenues from environmental taxes is the highest in Denmark (4.08%),

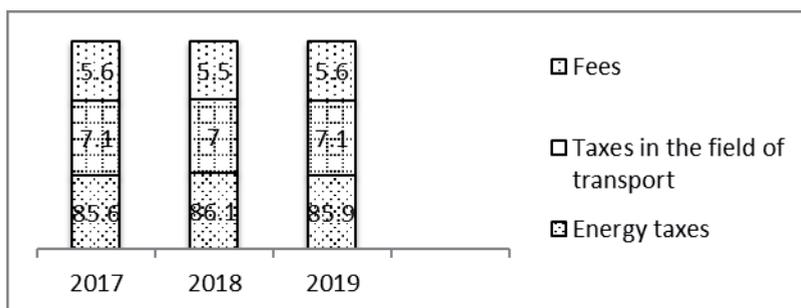
Slovenia (3.85%), Croatia (3.51%), while the lowest average amount was recorded in Lithuania (1.68%), Spain (1.75%) and Slovakia (1.76%) (Čaušević, 2020). According to Eurostat (2019), the most important category of environmental taxes in the European Union are energy taxes, as much as 77% of total eco-revenues in 2019, and this makes up only 2.7% of the European Union's GDP.

In the Republic of Serbia, according to the official systematization, ecological compensations are classified as non-tax public revenues. According to the Law on Environmental Protection from 2018, the following types of ecological compensations are represented:

- fee for the use of natural resources paid by the user of natural value for the use of the same, and also bears the costs of rehabilitation of degraded space;
- compensation for environmental pollution, paid by each person who causes the pollution;
- fee for the protection and improvement of the environment, paid by holders of property rights on real estate.

According to the data of the Republic Statistical Office of the Republic of Serbia (Environmental Fees Account, 2019) in 2019, revenues from environmental fees amounted to 223,716.2 million dinars, which is 5.6% more than the previous year. The largest share in the structure of revenues had the categories of energy taxes and taxes in the field of transport (85.9% and 7.1%), while pollution charges for the use of resources participated with 5.6% and 1.5%, respectively. In 2019, the share of revenues from environmental fees in GDP was 4.1%, while the share of total revenues from taxes and social contributions was 11%. Tax revenues in 2018 amounted to 211,825.5 million dinars. The categories of energy taxes and taxes in the field of transport had the largest share in the structure of revenues. In 2018, the share of tax revenues in the field of environmental protection in GDP was 4.2%. The value of tax revenues in 2017 amounted to 195,906.2 million dinars and the largest share in the structure of revenues had the categories of energy taxes and taxes in the field of transport (85.6% and 7.1%), respectively), while pollution taxes and taxes on resource use participated with 5.6%.

Graph 1: Revenues from taxes in the field of environmental protection



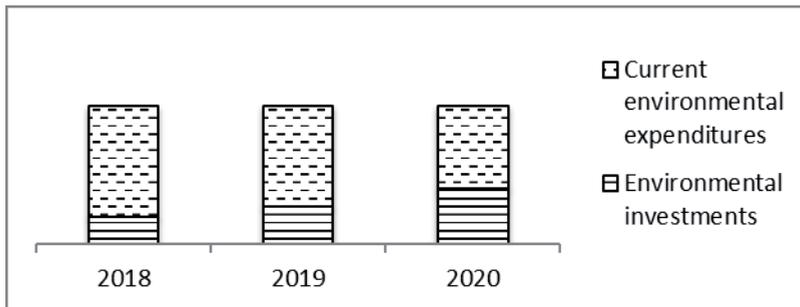
Source: According to Republic Bureau of Statistics, author's processing

The total costs of environmental protection in 2020 amounted to 46,698.1 million dinars, while the share of investments amounted to 18,470.6, and the share of costs for

environmental protection in the gross domestic product amounted to 0.8%. During 2019, the total environmental costs amounted to 42,367.8 million dinars, while the share of GDP remained the same and amounted to 0.8%. In 2018, the total costs of environmental protection were 10.7% lower than in the previous year and amounted to 38,266.7 million dinars.

Graph 2 shows that from 2018 to 2020, investments in environmental protection tend to grow, which suggests the importance of this issue in the overall development of the national economy.

Graph 2: Costs for environmental protection



Source: According to Republic Bureau of Statistics, author's processing

The lack of adequate control of local self-government in the spending of funds for environmental protection is a major obstacle in the Republic of Serbia. Due to unforeseen sanctions, a large number of local governments do not submit plans to spend these funds to the competent ministry. The goal of environmental taxation is to eliminate market imperfections which would reduce the production and consumption of environmentally harmful products. The introduction of environmental taxes requires the implementation of financial system reform and education of the final consumer. Practice shows that, if there is no penalty for environmental pollution, the economic entity is not motivated to reduce pollution on its own.

Conclusion

In modern business conditions, it is imperative to preserve the environment and rationally use of available resources. By implementing the concept of green marketing, companies strive to minimize the negative effects of their activities on the environment, to differentiate themselves in the market, and to achieve a competitive advantage on that basis. In addition to the segmentation of the market, creating an adequate marketing mix, it is also necessary for the state to influence economic entities to behave rationally through incentive measures.

Marketing activities are often seen as a part of environmental problems. The interest and concern of consumers for the preservation of the environment have contributed to companies applying ecological principles to a greater extent in their business. Companies whose offer is aimed at the segment of consumers who express concern for the environment should identify the motives of "green consumers" to buy

products. By understanding the needs of “green consumers” and creating an offer that respects their requirements, the company achieves competitive advantage in the market.

The opinion of some authors, at the end of the last century, was that investments in environmental protection are a compromise economic growth. Today, however, these two categories are linked in many ways and the fact is that preserving and protecting the environment will contribute to greater economic growth. By creating products and applying production processes and materials that respect environmental requirements, the company minimizes the negative effects on the environment. Improving the environmental performance of companies, defining an adequate strategy, creating an organizational culture that respects environmental principles, changing regulations, and educating consumers also contribute to more efficient environmental management.

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Bogdan Ubiparipović¹
*Atos Banka, Republic of Srpska,
Bosnia and Hercegovina*

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Lazar Raković²,
Slobodan Marić³,
Vuk Vuković⁴
*University of Novi Sad, Faculty of Economics in Subotica,
Subotica, Serbia*

DIGITAL BUSINESS AGILITY

Abstract

In the business environment, a high level of competitiveness is largely determined by technological development, hence the need for continuous adaptation of organizational strategies, often by digitally transforming the business models. Business agility, as the ability to identify and adapt to digital technologies in a timely manner, represents a successful response and plays a profound role in the organization's success. By analyzing recent literature, this paper examines the importance of digital business agility and how digital technologies themselves contribute to the development of comprehensive business agility. The paper describes the results of the research, which can serve as a strategic orientation for organizations on their journey to digital transformation and improved business agility.

Key words: Digital transformation, digital business agility

JEL classification: M1, M15

ДИГИТАЛНА ПОСЛОВНА АГИЛНОСТ

Апстракт

Висок ниво конкурентности у пословном окружењу, условљен првенствено технолошким развојем од организација захтева континуирану стратегијску адаптацију, не ретко на нивоу дигиталне трансформације пословних модела. Пословна агилност као перформанса правременог идентификовања и усвајања дигиталних технологија представља адекватну реакцију и значајно детерминише успех организације. Циљ овога рада је да се увидом у рецентну литературу укаже на значај дигиталне пословне агилности, њене кључне елементе као и допринос самих дигиталних технологија развоју свеобухватне пословне агилности. У раду су описани резултати истраживања, који организацијама могу послужити

¹ bogdan.ubiparipovic@gmail.com, ORCID ID 0000-0002-2462-610X

² lazar.rakovic@ef.uns.ac.rs., ORCID ID 0000-0002-1465-588X

³ slobodan.maric@ef.uns.ac.rs, ORCID ID 0000-0002-7414-4037

⁴ vuk.vukovic@ef.uns.ac.rs, ORCID ID 0000-0002-0040-9936

као стратегијска оријентација на путу дигиталне трансформације и унапређења пословне агилности.

Кључне речи: Дигитална трансформација, дигитална пословна агилност.

Introduction

The strategic and operational challenges of doing business in the digital vortex are complex due to a number of factors such as: economic globalization, hypercompetition, changes in customers' preferences, increased regulation and technological progress. In most cases, organizational agility refers to the ability to identify relevant changes in the environment in a timely manner and to respond appropriately and efficiently (Overby et al., 2006). The authors (Andrade et al., 2022; Murawski et al., 2018; Ravichandran, 2017) define agility as an organization's ability to quickly respond to changes and opportunities in the environment, conceptualizing it into three dimensions: customer responsiveness, operational flexibility and strategic flexibility.

As the digital environment is constantly evolving, the ability to identify relevant changes in such an environment and respond appropriately is one of the key aspects of survival and development for most companies (O. D. Lee et al., 2016; Overby et al., 2006; Park & Sawy, 2017; Peszynski, 2012; Salmela et al., 2022; Tallon & Pinsonneault, 2017). In light of this, Danesh and Hakkak (2016) believe that agility represents the gold standard in the era of information and communication technologies. Triaa et al. (2016) also argue that organizations need to react quickly and skillfully to the changing environment in order to be competitive. About 90% of executives surveyed by the Economist Intelligence Unit believe that organizational agility is critical to business success (Triaa et al., 2016). Despite a large number of definitions of agility, according to Triaa et al. (Triaa et al., 2016), they can be summarized by stating that change management is a key determinant of agility in the sense that it creates changes, emphasizing proactivity over reactivity, and learning from them. Technologies such as big data, analytics, cloud computing, mobile applications, social networking, Internet of Things, artificial intelligence and machine learning are examples of real drivers of business change (Brinkhues et al., 2016; Ismail et al., 2017; Matkovic et al., 2018; Sebastian et al., 2017; Wade, 2015). Several authors (Ismail et al., 2017; Matkovic et al., 2018; Schallmo & Williams, 2017) define digital business transformation as the integration of these technologies to improve performance through business change. According to Hesse et al. (2016), digital transformation is a complex issue that affects many or all segments within an organization. In order to achieve organizational agility that is a prerequisite for a successful transformation of their organizations, managers must find a balance between research and the use of their organizations' resources (Hess et al., 2016; Karimi & Walter, 2021).

Analyzing the critical success factors of digital transformation from a theoretical perspective, Ubiparipović (2021) in his doctoral dissertation, referring to the empirical findings and research of other authors (AlNuaimi et al., 2022; Berman, 2012; Hartl & Hess, 2017; Friedrich Holotiuk & Beimborn, 2017; Imgrund et al., 2018; Sahu et al., 2018), indicated that organizational agility is one of the most significant critical factors. Yusuf et al. (2022) and Holotiuk (2018) also suggested that digital transformation itself

enhances business agility. Similarly, O. D. Lee et al. (O. D. Lee et al., 2016) found that IT technologies can increase agility, particularly flexible IT infrastructure and alignment between IT and business strategy that are crucial to recognizing and responding to rapid market changes. This allows organizations to rapidly improve their products/services and adapt their operations to market changes (O. D. Lee et al., 2016).

Based on the above, this paper uses the phrase “digital business agility” to indicate the agility of an organization in recognizing and applying new digital technologies and models in a timely manner, but also to emphasize that digital technologies themselves influence and contribute to the development of organizational skills as well.

As explained in the introduction, this paper will present a theoretical overview of the key elements and characteristics of digital business agility. The first section focuses on organizational agility in general, its decomposition, and how digital technologies affect individual components of agility. The second section emphasizes the direct and indirect relationship between organizational performance and digital business agility.

Methodology

According to the methodology presented in the paper by Xiao and Watson (2019), a systematic review of the literature was conducted to answer the research questions. The Web of Science and Scopus databases were searched using the keywords “Digital business agility” (the number of hits is shown in Table 1). Analyses of the title, abstract, and keywords were carried out in the first stage. In the first iteration, 35 papers from the WoS database and 32 from Scopus were included in the further analysis. There were 23 papers selected after removing duplicates and analyzing all papers. In addition, six additional papers were identified through forward and backward research. Consequently, 29 papers were included in the further analysis. Below are the results of the analysis of those papers.

Table 1. Search results of electronic databases

Data source	Number of Hits	Number of papers included after analyzing Titles, Abstract and Keywords
Web of Science	413	35
Scopus	419	32

Key components of digital business agility

Referring to a number of authors, Overby et al. (Overby et al., 2006) interpret organizational agility as a permanent awareness of environmental changes and the ability to respond accordingly. This leads Overby et al. (Overby et al., 2006) to decompose organizational agility into two key activities: sensing and responding. Taking into account both academic and practical perspectives and in accordance with the decomposition of agility mentioned earlier, the authors developed a framework for illustrating different combinations of organizational capabilities for sensing and responding. Based on the

degree to which the organization is able to detect or sense changes as well as respond appropriately to those changes, the aforementioned work framework categorizes the organization into one out of four categories (low/high sensing capability, low/high responding capability) (Overby et al., 2006). Among the organizational capabilities that help to detect change, Overby et al. (Overby et al., 2006) mention marketing intelligence, which refers to monitoring competitors' actions, consumer preferences changes, and economic shifts. Based on the observed changes in the environment, the organization undertakes varying levels and ranges of responses, starting with complex undertakings and progressing to simpler ones and finally refraining from taking any action. The range of complex responses includes: launching new products, creating new distribution channels and targeting new customer segments. The category of simple responses includes: making a price change for products and services, increasing or decreasing production of existing products, and adjusting certain product features (Overby et al., 2006). A well-implemented organizational design also results in a high level of organizational agility, although research results indicate a difference between the effect of organizational design on sensing and responding (F. Holotiuk et al., 2018).

In line with the previous, Overby et al. (Overby et al., 2006) describe how agility requires organizational capabilities and capacities that enable sensing and responding function. Information technologies are included in both components, either directly or indirectly through the creation of digital options as an essential component of other processes and functions important for organizational agility (ERP, CRM, SCM). When it comes to direct contribution to the sensing and responding function, it first of all manifests itself through modern digital channels (internet and mobile technology) in order to gain a direct connection with consumers, as well as through the alternative channels of product and service sales and distribution. As important as the direct relationship between IT and agility may appear, perhaps the indirect relationship is even more crucial considering the role that information infrastructure plays in improving the performance of processes such as: product research and development, procurement, manufacturing and sales. By supporting these processes, IT directly contributes to better interconnectivity between internal actors and functions, as well as better integration with external partners such as consumers and suppliers (Overby et al., 2006).

Information technologies not only support organizations in digitalizing and expanding processes so that they can better integrate with consumers, suppliers, and partners internally and externally, but also provide a significant support for agility, as a critical component of knowledge management systems within an organization. A well-structured information system significantly participates in collecting, synthesizing, processing and distributing knowledge in the organization. Information technologies such as Data Warehouse, Decision Support Systems and OLAP tools can help organizations in creating knowledge through real-time data monitoring, recognition of hidden patterns among data, and scenario modeling. This directly contributes to the sensing function of agility by identifying emerging opportunities or threats (Overby et al., 2006). It is concluded by Overby et al. (Overby et al., 2006) that in support of knowledge management systems, information technologies primarily contribute to improving the sensing component of agility. Similarly, the technologies incorporated into the mentioned business processes primarily contribute to the responding component of agility. In spite of the specific contribution of information technology to agility, Overby et al. (Overby

et al., 2006) indicate that IT technologies by themselves do not perform this role if their infrastructure is monolithic, nonintegrated, inflexible, and insufficiently scalable. As these are expensive technologies, inadequate planning, design, and management will result in a large cost to the organization, not compensating for it by improving the organization's agility and performance (Overby et al., 2006). IT tools and data infrastructure - a well-aligned and consistent IT interfaces, real-time communication and work-management tools are integral component of any agile organization (Shafiee Kristensen et al., 2021). Likewise, Andrade (2022) argues that agility requires orchestration of digital resources.

Defining simplified business agility as effective sensing and responding, Park & Sawy (Park & Sawy, 2017) identify three key phases of the sense-response process: *sensing, decision-making and acting* (Figure 1).

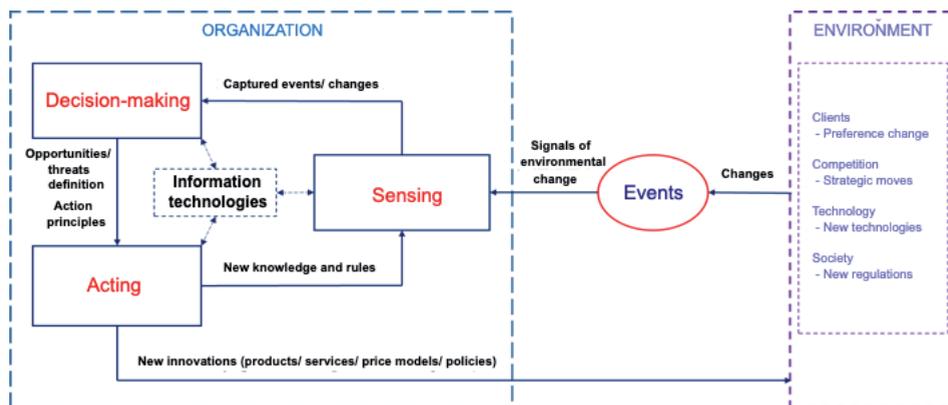


Figure 1. Organizational sense-response process loop
Adapted from source (Park & Sawy, 2017)

The *sensing* phase refers to strategically scanning business events that manifest business environment changes that might have significant impact on organizational strategy, competitive action, and future performance. Sensing involves gathering information about events of environmental change (e.g., customer preferences, competitors' strategic moves, the emergence of new technologies, and new regulations) and eliminating relatively irrelevant information. The *decision making* phase involves several interrelated activities that interpret the captured events and categorize them as opportunities or threats. To understand the implications of captured events, the organization gathers, aggregates, structures, and evaluates relevant information from multiple external and internal sources. Opportunities and threats are defined through these activities. Decisions are then made and a plan of action is drawn up to maximize the effects of opportunities or minimize the consequences of threats. The *acting* phase refers to a set of activities defined in an action plan that explains how to reconfigure resources or adapt business processes in a way that initiates new competitive actions in the market (Park & Sawy, 2017).

According to Park and Sawy (Park & Sawy, 2017), IT supports all of the activities mentioned in the sense-response process, and they emphasize business intelligence (BI)

and communication technologies as they play an integral role in all key tasks. The authors (Park & Sawy, 2017) claim that the functionalities provided by BI and communication technologies (to capture, process, store and share data, information, rules and knowledge) form a central nervous system of the sense-response process. Through sensing and decision-making activities, organizations learn from new events and create new data, rules and knowledge that BI systems store and distribute to different business units and sectors through communication technologies. More specifically, BI technologies provide a set of functionalities that help efficiently build, manage and access consistent data across an organization and extract patterns from big data, which supports sense-response activities. BI technologies allow organizations to store and manage codified knowledge and rules, which, in turn, enables them to automatically monitor and register important business events (e.g., digital dashboard with workflow algorithms). BI technologies also enable access to consistent databases at the level of the entire organization (Data Warehouse) including the creation of what-if analyses, data exploration and visualizations, which can significantly support and facilitate timely decision-making. In practice, in order to cope with rapid and uncertain changes in business, organizations have extensively developed business intelligence systems, including Data Warehouse, data mining, Balanced Scorecard, digital dashboard and online analytical processing (OLAP) (Park & Sawy, 2017).

In the context of the digital technologies' effect on organizational agility, Danesh and Hakkak (Danesh & Hakkak, 2016) discuss in their study how business intelligence technologies contribute to the improvement of agility. According to the authors, in response to the pressures of a changing environment and innovations, modern organizations have complex structures and are constantly forced to change. An environment like this requires an agile organization that must make complex strategic, tactical, and operational decisions under time constraints. The decision-making process requires effective management of data, information and knowledge, which is the task of a business intelligence system. Business intelligence systems, through analytical tools, combine information collection, storage and processing techniques to deliver and present complex internal and external information to planners and decision makers in a timely manner (Danesh & Hakkak, 2016).

The study conducted by Troise et al. (2022) highlighted three antecedents of agility: digital technologies capability, relational capability and innovation capability. The research results confirm that the above three prerequisites contribute to the business agility of the organization, while digital technologies play a central role in the above process and business agility contributes to the success of the organization. Liu et al. (2023) empirically demonstrated that digital platform capabilities enable organizations to adapt rapidly, flexibly, and effectively to market changes (representing digital agility), implement strategic adjustments, and improve their business performance.

Lee et al. (2015) argue that in today's highly competitive business environment, organizational agility is essential to success as it reflects the organization's ability to continuously monitor and sense market changes and respond accordingly. It is also recognized by Lee et al. that information technology (IT) provides a key platform on which modern organizations compete by leveraging their digitized processes and knowledge. Accordingly, the strategic management of organizational IT resources has attracted attention as an important factor of organizational agility. In particular, with continuous progress in IT solutions and services, IT ambidexterity - the ability of organizations to

simultaneously explore new IT resources and practices (IT exploration), as well as the ability to exploit current IT resources and practices (IT exploitation) - is recognized as a fundamental capability that can enable organizational agility and good performance. Lee et al. (O. K. Lee et al., 2015) propose a conceptual model that shows dual capacity of IT (IT ambidexterity) has a positive effect on the ability of operational ambidexterity, which directly affects the improvement of organizational agility, emphasizing that dynamism of a company's environment affect those relationships (O. K. Lee et al., 2015).

The impact of digital business agility on organizational performance

In their research, Tallon and Pinsonneault (Tallon & Pinsonneault, 2017) discussed the relationship between IT competencies and organizational agility and their impact on organizational performance in a volatile business environment. The conceptual model presented by the authors shows that, historically, aligning IT and business strategy has a positive impact on organizational performance (profitability, productivity, sales growth, etc.), with organizational agility playing a significant role in a changing environment. Their model also shows that IT infrastructure flexibility has a positive impact on agility, as strong as the impact of alignment on agility. The mediating influence of agility is particularly significant in the context of a volatile market environment caused by greater uncertainty in international financial markets, changing consumer demands and rapid product obsolescence. In such an environment, agility defined as the ability to quickly detect opportunities and threats and effectively respond to them becomes a key business imperative (Tallon & Pinsonneault, 2017).

Murawski et al. (Murawski et al., 2018) refer in their study to the approach of Bharadwaj et al. (2013) who propose the concept of Digital Business Strategy (DBS). According to their rather broad definition, DBS is "*organizational strategy formulated and executed by leveraging digital resources to create differential value*". The conceptual model developed by Bharadwaj et al. (Bharadwaj et al., 2013) shows that digital business strategy has a positive impact on organizational performance. Based on empirical research, conducted on a sample of 123 large enterprises from Germany, Austria and Switzerland, Murawski et al. (Murawski et al., 2018) confirm the assumptions that a suitable DBS, which is fully integrated into the organization and which is fully accepted by the leading staff, will significantly influence the level of innovation of the organization. According to the research, organizational innovation affects profitability, but there is no direct interdependence between the two. Instead, the relationship was found to be fully mediated by organizational agility (Murawski et al., 2018). The study conducted by Ravichandran (Ravichandran, 2017) shows that the innovation capacity of an organization has a positive relationship with organizational agility that provides flexibility to configure resources into a system of activities that can be profitable.

Brinkhues et al. (Brinkhues et al., 2016) focused on the understanding the impact of specific digital capabilities on improving digital business performance. These authors see digital capabilities as skills that are needed to go beyond pure IT and to include specific technologies, such as: social media, mobile, and analytic skills to drive value from big data. Brinkhues et al. (Brinkhues et al., 2016) conceptualized and showed that agility, ecosystem connectivity, process digitization and visualization have a positive impact on digital business

performance. According to Brinkhues et al. (Brinkhues et al., 2016), the mentioned digital capabilities enable the improvement of processes and customer relationships, thereby improving the overall digital business, affecting at the same time operational and strategic fields. The agility of the organization enables quick decision-making, which directly affects the client's satisfaction and the image of the organization itself (Brinkhues et al., 2016). According to (2018), dealing with dynamic changes in the market is about developing agility techniques to respond to threats and turn them into opportunities for adaptation and differentiation. Therefore, increasing performance refers to effective and timely response to potential changes occurring in the business environment (Fotso, 2018).

Troise et al. (2022) focused their study on small and medium-sized enterprises by investigating three antecedents of agility, digital technology capability, relational capability and innovation capability, as well as the effects of agility on three outcomes: financial performance, product, and process innovation. The results of the study indicated that the aforementioned three capabilities contribute to building organizational agility in small and medium-sized enterprises and that agility has a positive impact on financial performance. Consequently, agility contributes to the success or performance of small and medium-sized enterprises, while digital technologies play a key role in this process.

A quantitative and qualitative study conducted by Yusuf et al. (2022) explores the impact of strategic agility on organizational performance based on the claim that IT drives change and innovation in business. Having conducted the research, their assumption of related studies was confirmed that organizations that use strategic agility move to a higher level of organizational performance. In a study conducted by Holitluk et al., the results revealed that agility has a positive impact on organizational performance, which illustrates how agility is essential to improving organizational performance in times where digitalization and digital innovations are driving a lot of changes. The studies (Lungu, 2020; Troise et al., 2022) also emphasize the importance of organizational agility in determining company performance.

According to the created working framework, Overby et al. (Overby et al., 2006) suggest that agility requires an extensive engagement of operational and strategic capacities in the organization. The creation and maintenance of these capacities also generate costs, so it is essential to be aware of the contexts in which agile approaches are necessary and those in which they generate unnecessary costs. The determining factor is the dynamics of environmental changes. A high level of agility is not required in some industries, such as energy, where the environment is relatively stable and regulated. However, in industries where market conditions are dynamic and turbulent, agility becomes an indispensable success factor (Overby et al., 2006). The organization risks assuming the adoption of new technologies for sustainable and performing business by overemphasizing agility in the context of digital transformation (Nwaiwu, 2018). According to the same author, technology, despite its undisputed importance, does not in itself represent value, but the value is rather derived from business being done differently as a result of the technology. Furthermore, Troise et al. (2022) note that the mere availability of digital technologies is insufficient, so they must develop their capabilities. Consequently, transformation processes require a holistic perspective beyond a narrow view of technology as a dominant factor (Nwaiwu, 2018).

Conclusion

In the conducted theoretical research, the assumptions about the business context of modern organizations were confirmed. As the business environment changes rapidly, driven primarily by technological advancement, organizations must continuously and efficiently adapt through digital transformation. To ensure that digital transformation proceeds at a pace consistent with the aforementioned dynamics of environmental changes, organizations need to develop business agility, which manifests itself as a constant awareness of changes in the environment and a capability to respond rapidly and adequately.

An organization practices business agility through three sensing-responding activities: timely sensing of changes, informed decision making, and effective acting. It is the application of modern digital technologies that makes each of the above activities effective, which in this case represents both the goal and the means of achieving digital business agility.

The research results also showed that organizational agility has a positive effect on organizational performance. However, that contribution to performance is mediated and conditioned by various factors such as: type of industry, dynamics of the environment, IT capacities, size and age of the organization. Furthermore, the existing organizational capabilities, skills, attitudes, and behaviors of the employees are crucial to a successful transition to an organizational state characterized by fluidity, adaptability, and constant change.

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